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ENCYCLOPÆDIA PERTHENSIS.

CAPRÆ SALTANTES, [Lat. *i. e.* dancing goats,] in meteorology, fiery meteors or exhalations, ſometimes ſeen in the atmoſphere. They form inflected lines, reſembling in ſome meaſure the caperings of a goat; whence the name.

CAPRALA, an iſle of France, in the Tuſcan ſea, NE. of Corſica, and in the dept. of Corſica. It is populous, and has a ſtrong caſtle. It is about 15 miles in circumference. Lon. 11. 5. E. Lat. 43. 15. N.

CAPRAOLA, a town of Italy, 8 miles S. of Viterbo, and 20 N. of Rome. Lon. 13. 5. E. Lat. 43. 15. N.

(1.) CAPRIARIA, one of the Zemiti iſlands, in the Adriatic, about 4 leagues from Italy. It is very ſmall, and uninhabited. Lon. 33. 22. E. from Ferro. Lat. 42. 10. N.

(2.) CAPRARIA, in botany, SWEET-WEED, a genus of the angioſpermia order, belonging to the didynamia claſs of plants; and in the natural method ranking under the 40th order, *Perſonatæ.* The calyx is quinquepartite; the corolla campanulated, quinquefid, with acute ſegments; the capſule bivalved, bilocular, and polyſpermous. There is but one ſpecies, viz.

CAPRARIA BIFLORA, a native of the warm parts of America. Being a troubleſome weed, and without beauty, it is never cultivated except in botanic gardens for the ſake of variety.

CAPRAROLA, one of the moſt magnificent palaces in Italy, ſeated on a hill, in Ronciglione, whoſe foot is watered by the Tircia. It was built by cardinal Farneſe; and has 5 fronts, in the middle of which is a round court, though all the rooms are ſquare, and well proportioned. It is 27 miles NW. of Rome.

CAPREA, or CAPREÆ, } in ancient geography, an iſland in the Tuſcan ſea, famous for the retreat of the emperor Tiberius for 7 years, during which he indulged himſelf in the moſt ſcandalous debaucheries. See TIBERIUS. Before he came hither, Capreæ had attracted the notice of Auguſtus, as a moſt eligible retreat, though in ſight of populous cities, and almoſt in the centre of the empire. His ſucceſſor preferred it to every other reſidence; and in order to vary his pleaſures, and enjoy the advantages as well as avoid the inconveniences of each revolving ſeaſon, built 12 villas in different ſituations, dedicated to the 12 greater gods: the ruins of ſome of them are ſtill to be ſeen. See CAPRI, N° 1. According to Dion Caſſius, this iſland was wild and barren before the Cæſars took it under their immediate protection. The odium attached to the memory of Tiberius proved fatal to his favourite abode; ſcarce was his death proclaimed at Rome, when the ſenate iſſued orders for the demolition of every fabric he had raiſed on the iſland, which, by way of diſgrace, was thenceforward deſtined to be a ſtate priſon. The wife and ſiſter of Commodus were baniſhed to its inhoſpitable rocks, which were ſoon ſtained with their blood. In the middle ages Capreæ became an appendage of the Amalfitan republic, and after the downfal of that ſtate, fell to the duchy of Naples. There ſtood a pharos on this iſland, which, a few days before the death of Tiberius, was overthrown by an earthquake.

* CAPREOLATE. *adj.* [from *capreolus*, a tendril of a vine, Lat.] Such plants as turn, wind, and creep along the ground, by means of their tendrils, as gourds, melons, and cucumbers, are termed, in botany, *capreolate* plants. *Harris.*

CAPREOLI, in botany, the tendrils, by which vines, peas, and other creeping plants, faſten themſelves to any thing near them.

(1.) CAPREOLUS, in anatomy, the *helix*, or outer ambit of the ear. See ANATOMY, § 549.

(2.) CAPREOLUS, in ancient huſbandry, a kind of iron hoe with two fangs.

(3.) CAPREOLUS, Elias, a native of Breſcia, an excellent civilian and learned hiſtorian, who wrote a Hiſtory of Breſcia, and other works. He died in 1519.

(1.) CAPRI, an iſland at the entrance of the Gulf of Naples, anciently called CAPREA, 7 miles long and 2 broad. A large portion of its ſurface is unfit for cultivation; but every ſpot, that will admit the hoe, is induſtriouſly tilled, and richly laden with the beſt productions of the earth. It exhibits ſome relics of its ancient grandeur. Two broken columns ſhow the entrance of Tiberius's court; (See CAPREA;) at Santa Maria, there are extenſive vaults and reſervoirs; and on an adjacent hill, the remains of a light-houſe. The iſland is much frequented by quails, forming the principal revenue of the biſhop, whence he is called the Biſhop of Quails.

(2.) Capri, the capital of the above iſle, ſeated on a high rock at the W. end of it, 27 miles from Naples. Lon. 14. 8. E. Lat. 40. 11. N.

CAPRIANA, a town of Italy, in the late Italian republic, dep. of Mincio.

CAPRIATA, Peter John, a civilian and hiſtorian, was born at Genoa. He wrote, in Italian, the hiſtory of the wars of Italy; an Engliſh tranſlation of which was printed in London in 1663.

* CAPRICE. } *n. ſ.* [*caprice*, Fr. *capricho*, Sp.]
* CAPRICHIO. } Freak; fancy; whim; ſudden change of humour.—It is a pleaſant ſpectacle to behold the ſhifts, windings, and unexpected *caprichios* of diſtreſſed nature, when purſued by a cloſe and well managed experiment. *Glanv. Sceps, Pref.*—We are not to be guided in the ſenſe of that book, either by the miſreports of ſome ancients, or the *caprichios* of one or two neoterics. *Grew.*—

Heav'n's great view is one, and that the whole;
That counterworks each folly and *caprice*,
That diſappoints th' effect of ev'ry vice. *Pope.*

—If there be a ſingle ſpot more barren, or more diſtant from the church, the rector or vicar may be obliged, by the *caprice* or pique of the biſhop, to build. *Swift.*

* CAPRICIOUS. *adj.* [*capricieux*, Fr.] Whimſical; fanciful; humourſome.

* CAPRICIOUSLY. *adv.* [from *capricious.*] Whimſically; in a manner depending wholly upon fancy.

* CAPRICIOUSNESS. *n. ſ.* [from *capricious.*] The quality of being led by caprice, humour, whimſicalneſs.—A ſubject ought to ſuppoſe, that there are reaſons, although he be not appriſed of them; otherwiſe he muſt tax his prince of *capriciouſneſs*, inconſtancy, or ill deſign. *Swift.*

(1.) * CAPRICORN. *n. ſ.* [*capricornus*, Latin.] One of the ſigns of the zodiack; the winter ſolſtice.—Let the longeſt night in *Capricorn* be of 15 hours, the day conſequently muſt be of 9. *Notes to Creech's Manilius.*

(2.) Capricorn. See Astronomy, § 348. The ancients accounted Capricorn the 10th ſign; and when the ſun arrived thereat, it made the winter ſolſtice with regard to our hemiſphere: but the ſtars having advanced a whole ſign towards the E. Capricorn is now rather the 11th ſign; and it is at the ſun's entry into Sagittarius, that the ſolſtice happens, though the ancient manner of ſpeaking is ſtill retained. This ſign is repreſented on ancient monuments, medals, &c. as having the fore part of a goat and the hind part of a fiſh, which is the form of an Ægipan: ſometimes ſimply under the form of a goat.

(3.) Capricorn, tropic of, a leſſer circle of the ſphere, which is parallel to the equinoctial, and at 23° 30′ diſtance from it ſouthwards; paſſing through the beginning of Capricorn. See Astronomy, *Index*.

CAPRIFICATION, a method uſed in the Levant, for ripening the fruit of the domeſtic fig tree, by means of inſects bred in that of the wild fig tree. The moſt ample and ſatisfactory accounts of this curious operation in gardening are thoſe of Tournefort and Pontedera: the former, in his Voyage to the Levant, and in a Memoir delivered to the academy of ſciences at Paris in 1705; the latter, in his *Anthologia*. The following is the ſubſtance of Tournefort's account: "Of the 30 ſpecies or varieties of the domeſtic fig-tree which are cultivated in France, Spain, and Italy, there are but two cultivated in the Archipelago. The firſt ſpecies is called ornos, from the old Greek *erinos*, which ſignifies a wild fig tree. The 2d is the domeſtic or garden fig tree. The former bears ſucceſſively, in the ſame year, 3 ſorts of fruit, called *fornites*, *cratitires*, and *orni*; which, though not good to eat, are found abſolutely neceſſary towards ripening thoſe of the garden fig. Theſe fruits have a ſleek even ſkin; are of a deep green colour; and contain in their dry and mealy inſide ſeveral male and female flowers upon diſtinct footſtalks, the former above the latter. The *fornites* appear in Auguſt, and continue to November without ripening: in theſe are bred ſmall worms, which turn to a ſort of gnats, nowhere to be ſeen but about theſe trees. In October and November, theſe gnats of themſelves make a puncture into the 2d fruit, called *cratitires*. Theſe do not ſhow themſelves till the end of September. The *fronites* gradually fall away after the gnats are gone; the *cratitires*, on the contrary, remain on the tree till May, and incloſe the eggs depoſited by the gnats when they pricked them. In May, the 3d ſort of fruit, called *orni*, begins to be produced by the wild fig-trees. This is much bigger than the other two; and when it grows to a certain ſize, and its bud begins to open, it is pricked in that part by the gnats of the *cratitires*, which go from one fruit to another to depoſit their eggs. Sometimes the gnats of the *cratitires* are ſlow to come forth in certain parts, while the *orni* in thoſe very parts are diſpoſed to receive them. In this caſe the huſbandman is obliged to look for the *cratitires* in another part, and fix them at the ends of the branches of thoſe fig trees whoſe *orni* are in a fit diſpoſition to be pricked by the gnats. If they miſs the opportunity, the *orni* fall, and the gnats of the *cratitires* fly away. None but thoſe who are well acquainted with the culture know the critical moment of doing this; and in order to know it, their eye is perpetually fixed on the bud of the fig; for that part not only indicates the time that the prickers are to iſſue forth, but alſo when the fig is to be ſucceſsfully pricked: if the bud is too hard and compact, the gnat cannot lay its eggs; and the fig drops when the bud is too open. The uſe of all theſe 3 ſorts of fruit is to ripen the fruit of the garden fig tree, in the following manner. During the months of June and July, the peaſants take the *orni*, at the time their gnats are ready to break out, and carry them to the garden fig trees: if they do not nick the moment, the *orni* fall; and the fruit of the domeſtic fig tree, not ripening, will ſoon fall too. The peaſants are ſo well acquainted with theſe precious moments, that, every morning, in making their inſpection, they only transfer to their garden fig trees ſuch *orni* as are well conditioned, otherwiſe they loſe their crop. In this caſe, however, they have one remedy, though an indifferent one; which is, to ſtrew over the garden fig trees another plant, in whoſe fruit there is alſo a ſpecies of gnats which anſwer the purpoſe in ſome meaſure." The caprification of the ancient Greeks and Romans, deſcribed by Theophraſtus, Plutarch, Pliny, and other authors of antiquity, correſponds in every circumſtance with what is practiſed at this day in the Archipelago and in Italy. Theſe all agree in declaring, that the wild fig tree, *caprificus*, never ripened its fruit; but was abſolutely neceſſary for ripening that of the garden or domeſtic fig, over which the huſbandmen ſuſpended its branches. The reaſon has been ſuppoſed to be that by the punctures of theſe inſects the veſſels of the fruit are lacerated, and thereby a greater quantity of nutritious juice derived thither; or that, in depoſiting their eggs, the gnats leave behind them ſome ſort of liquor proper to ferment gently with the milk of the figs, and to make their fleſh tender. The figs in Provence, and even at Paris, ripen much ſooner for having their buds pricked with a ſtraw dipped in olive oil. Plums and pears likewiſe pricked by ſome inſects, ripens much faſter, and the fleſh round ſuch puncture is better taſted than the reſt. It is not to be diſputed, that conſiderable changes happen to the contexture of fruits ſo pricked, as they do to parts of animals pierced with any ſharp inſtrument. Others have ſuppoſed that theſe inſects penetrated the fruit of the tree to which they were brought, and gave a more free admiſſion to the air, and to the ſun. Linnæus explained the operation, by ſuppoſing that the inſects brought the farina from the wild fig, which contained the male flowers only, to the domeſtic fig, which contained the female ones. Haſſelquiſt, from what he ſaw in Paleſtine, ſeemed to doubt of this mode of fructification. M. Bernard, in the Memoirs of the Society of Agriculture, oppoſes it more decidedly. He could never find the inſect in the cultivated fig; and, in reality, it appeared to leave the wild fig, after the ſtamina were mature, and their pollen diſſipated: beſides, he adds, what they may have brought on their wings muſt be rubbed away, in the little aperture which they would form for themſelves. At Malta, where there are 7 or 8 varieties of the domeſtic fig, this operation is only performed on thoſe which ripen lateſt; the former are of a proper ſize, fine flavour, and in great abundance without it; ſo that he thinks the caprification only haſtens the ripening. He examined the parts of fructification of the fig; and he obſerves, if this examination be made previous to the ripening, that round the eye of the fig, and in the ſubſtance of its covering, may be ſeen triangular dentated leaves, preſſed one againſt another; and under theſe leaves are the ſtamina, whoſe pollen is deſtined for the impregnation of the grains, which fill the reſt of the fruit. Theſe male organs are much more numerous in the wild fig than in the domeſtic; (ſee Caprificus;) and the ſtamina are found to contain a yellow duſt, which may be collected when it is ripe. The wild figs, when ripe, are not ſucculent, and have no taſte, though the grains are diſpoſed in the ſame manner as in the other kind. The pith of the grain ſerves as food to a ſpecies of the cynips, whoſe larva is white, till the moment of its transformation; and it is by an opening, in the direction of the piſtil, that the inſect penetrates the grain. From this account it is thought probable, that the inſect is only communicated by accident to the domeſtic fig, and that the flowers of this genus are ſometimes hermaphrodites. But the number of hermaphrodite flowers being fewer on the cultivated than on the wild fig, the ſeeds are fecundated more certainly and quickly by the caprification; and every botaniſt knows, that when the impregnation is completed, the flower ſoon withers; whereas, if delayed, it continues in bloom much longer. See Botany, § 63. This view of the ſubject, therefore, explains the reaſon why, in Malta, the caprification is practiſed on the late kind of figs, becauſe it haſtens the formation and maturity of the fruit.

CAPRIFICUS, in botany, the wild fig tree; which Mr Lee ſays, has chiefly or only male flowers. See Ficus.

CAPRIFOLIUM, in botany, a ſynonime uſed by Tournefort, for the honey-ſuckle. See Lonicera.

CAPRIGLIA, a town of Italy, in the kingdom of Naples, and Principato Ultra, 13 miles S. of Benevento.

CAPRIMULGUS, the goat-sucker, or fern-owl, in ornithology, a genus of birds belonging to the order of paſſeres. The beak is incurvated, ſmall, tapering, and depreſſed at the baſe; the mouth opens very wide. See Plate LIX. The noſtrils are tubular. There are ſeveral ſpecies or varieties in different countries, but all nearly ſimilar to one or other of the following:

1. Caprimulgus Americanus, has the tubes of the noſtrils very conſpicuous. It is a night bird, and is found in America.

2. Caprimulgus Europæus, has the tubes of the noſtrils hardly viſible. It feeds on moths, gnats, dorrs, or chaffers; from which Charleton calls it a *dorr hawk*, its food being entirely of that ſpecies of beetle during the month of July, the period of that inſect's flight in this country. This bird migrates. It makes but a ſhort ſtay with us; appears the latter end of May; and diſappears, in the northern parts of our iſland, the later end of Auguſt; but, in the ſouthern, ſtays about a month later. It inhabits all parts of Britain from Cornwall to Roſs-ſhire. Mr Scopoli ſeems to credit the report of their ſucking the teats of goats, an error delivered down from the days of Ariſtotle. Its notes are moſt ſingular. The loudeſt ſo much reſembles that of a large ſpinning wheel, that the Welſh call this bird *aderyn y droell*, or the *wheel-bird*. It begins its ſong moſt punctually on the cloſe of day, ſitting uſually on a bare bough, with the head lower than the tail, the lower jaw quivering with the efforts. The noiſe is ſo very violent, as to give a ſenſible vibration to any little building it chances to alight on and emit this ſpecies of note. The other is a ſharp ſqueak, which it repeats often; this ſeems a note of love, as it is obſerved to reiterate it when in purſuit of the female among the trees. It lays its eggs on the bare ground; uſually two; they are of a long form, of a whitiſh hue, prettily marbled with a reddiſh brown. The length of this bird is 10½ inches; extent 22. Plumage, a beautiful mixture of white, black, and aſh-colour, and ferruginous diſpoſed in lines, bars, and ſpots. The male is diſtinguiſhed from the female by a great oval

white ſpot near the end of the 3 firſt quill feathers, and another on the outmoſt feathers of the tail. This is the only one of the genus which is found in Europe. A variety, only 8 inches in length, inhabits Virginia, in ſummer: arrives there towards the middle of April, and frequents the mountainous parts, but will frequently approach the houſes in the evening, where it ſettles on a rail or poſt, and cries ſeveral times very loud, ſomewhat like the word *whiperiwhip*, or *whip-poor-will*, the firſt and laſt ſyllables pronounced loudeſt. After continuing in one place for ſome time, it flies to another, and does the ſame; ſometimes 4 or 5 cry altogether: this noiſe begins juſt after ſun-ſet, and continnes at intervals till juſt before ſun-riſe. It does not catch inſects always on the wing; for it frequently ſits upon a convenient place, and leaps up after them as they fly by, and returns to the ſame ſpot again. Its eggs are of a dull green with duſky ſpots and ſtreaks. Kalm ſays that the fleſh is good to eat. Another variety, larger, inhabits Virginia and Carolina; where it is called the *rain-bird*, becauſe it never appears in the day-time, except when the ſky, being obſcured with clouds, betokens rain.

(1.) CAPRINO, a valley and vicarage of the late Maritime diviſion of Auſtria, in the Veroneſe, between the Adige and Monte Baldo, containing four communes.

(2.) Caprino, the capital of the above diſtrict. It is populous, and lies between two rivulets which join below it and fall into the Adige.

* CAPRIOLE. *n. ſ.* [French, in horſemanſhip.] *Caprioles* are leaps, ſuch as a horſe makes in one and the ſame place, without advancing forwards, and in ſuch a manner, that when he is in the air, and height of his leap, he yerks or ſtrikes out with his hinder legs even and near. A *capriole* is the moſt difficult of all the high menage, or raiſed airs. It is different from the *croupade*, in this, that the horſe does not ſhow his ſhoes; and from a *balotade*, in that he does not yerk out in a *balotade*. *Farrier's Dict.*

CAPRIOLO, a pleaſant village of Italy, in the late Italian republic, and department of the Mella, ſituated on a canal that runs from lake Iſco.

CAPSA, in ancient geography, a large and ſtrong town of Numidia, ſituated amidſt vaſt deſarts, waſte, uncultivated, and full of ſerpents, where Jugartha kept his treaſure. In his time it was taken and raiſed by Marius, who put to death all the citizens capable of bearing arms, and ſold the reſt for ſlaves. It was, however, afterwards built by the Romans, and ſtrongly fortified; but, on the decline of their empire, was taken and again demoliſhed by Occuba, a famous Arab general. The walls of the citadel are ſtill remaining, and are monuments of the ancient glory and ſtrength of Capſa. They are 24 fathoms high, and 5 thick, built of large ſquare ſtones, and have now acquired the ſolidity and firmneſs of a rock. The walls of the town were rebuilt by the inhabitants ſince their firſt demolition; but were afterwards deſtroyed by Jacob Almanzar, who ſent a governor and troops into the province. In Marmol's time Capſa was very populous, and abounded with ſtately moſques and other ſtructures of ſuperb and elegant workmanſhip; but at preſent it is occupied by a poor and indigent people, oppreſſed by the Tuneſe government. In the centre of the city ſtands an incloſed fountain, which ſupplies the people with drink, and affords them an agreeable bath. The adjacent country is cultivated, and produces ſeveral kinds of fruit; but the climate is unhealthy. The inhabitants are remarkable for their peeviſhneſs of temper. Both men and women dreſs handſomely except their feet, which they cover with coarſe ſhoes of bungling workmanſhip, made of the rough ſkins of wild beaſts, equally inconvenient and unbecoming. Lon. 9. 3. E. Lat. 33. 15. N.

(1.) CAPSARIUS, [from *capſa*, a cheſt,] among the Roman bankers, was he who had the care of the money cheſt or coffer.

(2.) Capsarius, [from *capſa*, a ſatchel,] in antiquity, 1. a ſervant who attended the Roman youth to ſchool, carrying a ſatchel with their books in it, ſometimes alſo called librarius: 2. an attendant at the baths, to whom perſons committed the keeping of their clothes.

(I.) CAPSICUM, in botany, Guinea pepper, a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 28th order, Luridæ. The coralla is verticillated, and the fruit a ſapleſs berry. There are 10 ſpecies, viz.

1. Capsicum angulosum, with angular heart ſhaped fruit.

2. Capsicum annuum, with oblong fruit, the common long podded capſicum, commonly cultivated in the gardens. Of this there is one variety with red, and another with yellow fruit; and of theſe there are ſeveral ſub-varieties, differing only in the ſize and figure of their fruit.

3. Capsicum cerasiforme, with a round ſmooth fruit, doth not grow ſo tall as the other ſorts, but ſpreads near the ground; the leaves come out in cluſters, are of a ſhining green, and ſtand on long footſtalks. The fruit is of a beautiful red, and of the ſize of a cherry.

4. Capsicum conoide, the *hen-pepper*, with a conical red fruit growing erect.

5. Capsicum cordiforme, with heart-ſhaped fruit.

6. Capsicum frutescens, Barbary pepper, with ſmall pyramidal fruit growing erect.

7. Capsicum minimum, *bird pepper*, riſes with a ſhrubby ſtalk 4 or 5 feet high; the leaves are of a lucid green; the fruit grows at the diviſion of the branches, ſtanding erect: theſe are ſmall, oval, and of a bright red; they are much more ſharp and biting than thoſe of the other ſorts.

8. Capsicum olivaforme, with oval fruit. This and the anguloſum, conoide, cordiforme, and fruteſcens, (N° 1, 4, 5, and 6.) have no peculiar properties different from the others.

9. Capsicum pyramidale, is a native of Egypt, and hath much narrower leaves than the other ſorts. The pods always grow erect, and are produced in great plenty, ſo that the plants make a good appearance for 5 months in winter.

10. Capsicum tetragonum, the *bell-pepper*. The fruit of this is red, and is the only kind proper for pickling, the ſkin being tender: whereas

thoſe of the other ſorts are thin and tough. The pods are from an inch to an inch and an half or two inches long; are very large, ſwelling, and wrinkled, flatted at the top, where they are angular, and ſometimes ſtand erect, at others grow downward.

(II.) CAPSICUM, CULTURE AND USES OF THE DIFFERENT SPECIES OF. The 2d, 3d, and 10th ſpecies are annual plants, and muſt be propagated by ſeeds ſown on a hot-bed in ſpring, and treated as other exotics; they will, however, bear the open air, after being inured to it by degrees. The plants of the TETRAGONUM ſhould be taken from the hot bed, and planted in a rich ſpot of ground, in a warm ſituation, about 1½ foot aſunder. They muſt be ſhaded till they have taken root, and afterwards duly watered in dry weather, which will promote their growth and fertility, and enlarge the ſize of the fruit. By this management, 3 or 4 crops for pickling may be obtained in one year. The other ſorts are more tender; and therefore muſt be planted in pots plunged in a moderate hot-bed, and ſheltered under a frame. The fruit of the tetragonum muſt be gathered before they arrive at their full ſize, while the rind is tender. They muſt be ſlit down on one ſide to get out the ſeeds, after which they ſhould be ſoaked ſome days in ſalt and water; when taken out and drained, boiling vinegar muſt be poured on them in a ſufficient quantity to cover them, and cloſely ſtopped for two months; then they ſhould be boiled in the vinegar to make them green; but they want no addition of any ſpices and are the wholeſomeſt and beſt pickle in the world. The 6th ſpecies is uſed for making what is called *cayan-butter*, or *pepper-pots*, by the inhabitants of America, and which they eſteem the beſt of all the ſpices. The following is a receipt for making a pepper-pot: "Take the ripe ſeeds of the CAPSICUM FRUTESCENS, and dry them well in the ſun; then put them into an earthen pot, mixing flour between every ſtratum of pods; put them into an oven after the baking of bread, that they may be thoroughly dried; after which they muſt be well cleanſed from the flour; and if any of the ſtalks remain adhering to the pods, they ſhould be taken off, and the pods reduced to a fine powder: to every ounce of this add a pound of wheat flour, and as much leaven as is ſufficient for the quantity intended. After this has been properly mixed and wrought, it ſhould be made into ſmall cakes, and baked in the ſame manner as common cakes of the ſame ſize; then cut into ſmall parts, and baked again, that they may be as dry and hard as biſcuit; which being powdered and ſifted, is to be kept for uſe." This is prodigiouſly hot and acrimonious, ſetting the mouth as it were on fire. It is commended as a medicine for flatulencies; but perhaps ſuch hot irritating medicines do more harm than good. If the ripe pods of capſicum are thrown into the fire, they will raiſe ſtrong and noiſome vapours, which occaſion vehement ſneezing, coughing, and often vomiting, in thoſe who are near the place, or in the room where they are burnt. Some have mixed the powder of the pods with ſnuff, to give to others for diverſion: but there is danger in uſing it; for it occaſions ſuch violent fits of ſneezing, as may break the blood veſſels of the head.

CAPSQUARES, ſtrong plates of iron which cover the trunnions of a gun, and keep it in the carriage. They are faſtened by a hinge to the prize-plate, that they may lift up and down, and form a part of an arch in the middle to receive a third part of the thickneſs of the trunnions; for two thirds are let into the carriage, and the other end is faſtened by two iron wadges called the *fore-locks* and *keys*.

(1.) * CAPSTAN. *n. ſ.* [corruptly called *capſtern*; *cabeſtan*, Fr.] A cylinder, with levers to wind up any great weight, particularly to raiſe the anchors.—The weighing of anchors by the *capſtan*, is alſo new. *Raleigh's Eſſays.*—

No more behold thee turn my watch's key,
As ſeamen at a *capſtan* anchors weigh. *Swift.*

(2.) CAPSTAN, a large maſſy column, ſhaped like a truncated cone, and placed perpendicularly on the deck of a ſhip, and turned by levers, or bars, which paſs through holes pierced in its upper extremity; ſerving, by means of a cable which winds round the barrel to draw up burdens faſtened to the end of the cable. See Plate LX. The power of the *capſtan* is reducible to that of the axis in *peritrochio*. De Camus conſiders the *capſtan* as a perpetual lever. By it veſſels are drawn aſhore, and hoiſted up to be refitted; ſails hoiſted, &c. There are commonly two capſtans in a ſhip of war: the *main capſtan* placed behind the main maſt ſtanding on the firſt deck, and reaching 4 or 5 feet above the ſecond; this is alſo called *double capſtan*, becauſe it has two drum-heads, and ſerves two decks for drawing anchors; and becauſe its force may be doubled by applying hands on each deck. It has bars, whelps, &c. for turning and ſtopping it: ſee fig. 3. The *jeer capſtan*, or *little capſtan*, ſtands on the ſecond deck, between the main maſt and the mizen: its uſe is chiefly to heave upon the jeer-rope, or to heave upon the viol, to hold off by, when the anchor is weighed; and on other occaſions where a leſs force is required than to weigh the anchors, &c. See fig. 2. The French call that an *Engliſh capſtan* where there are only half bars uſed; and which, for that reaſon, is only half perforated: this is thicker than the others. There is alſo a *flying capſtan*, which may be moved from place to place. The parts of a capſtan are, the foot *d*, fig. 2. which is the loweſt part; the *ſpindle f*, the ſmalleſt part of which turns round in an iron ſocket, called the *ſaucer*: the *whelps*, *bb*, a ſort of brackets ſet into the body of the capſtan cloſe under the bars, and reaching downwards from the lower part of the drum-head to the deck; the *barrel* A, the main body of the whole: the *drum-head c*, a broad cylindric piece of wood fixed above the barrel and whelps, in which are the holes for the bars to be put into: the *bars* are ſmall pieces of timber by which the men heave; the *pins e*, are little bolts of iron, thruſt perpendicularly through the holes of the drum-head, and through a correſponding hole in the end of the bar, made to receive them when the bars are fixed: the *pawls* are pieces of iron bolted to one end of the beams of the deck, cloſe to the body of the capſtan, but ſo as that it has liberty to turn about every way, and againſt them do the whelps of the capſtan bear: ſo as that by them the capſtan may be ſtopped from turning back. There are alſo hanging pawls *g, g*, fig. 3. which reach from the deck above the drum-head immediately beneath it. The *ſwifter* is a rope paſſed horizontally through holes in the outer ends of the bars and drawn tight, to keep the men ſteady whilſt they work, and afford room for a greater number to work at once. Formerly the bars of the capſtan went entirely through the head of it, and conſequently were more than double the length of the preſent ones; the holes were therefore formed at different heights, as repreſented in fig. 1. But this machine had ſeveral inconveniences, and has long been entirely diſuſed in the navy. Some of this ſort of capſtans however, are ſtill retained in merchant ſhips, and are uſually denoted *crabs*. The ſituation of the bars in a crab, as ready for heaving, is repreſented in fig. 4.

(3.) CAPSTAN, TERMS USED RESPECTING THE. *Rig the capſtan* ſignifies fix the bars in their reſpective holes; *heave the capſtan*, go round with it, heaving on the bars: *ſurge the capſtan*, and *come up capſtan*, mean ſlacken the cable which you heave by; in a like ſenſe they alſo ſay, *launch the capſtan*: *pawl out the capſtan*, ſignifies, ſtop it from going back.

CAPSTAND, } and CAPSTOW, are all various
CAPSTERN, } ſpellings of CAPSTAN.

CAPSULA. See BOTANY, *Index*.

CAPSULÆ ATRABILARIÆ, called alſo *glandulæ renales*, and *renes ſuccenturiati*. See ANATOMY, § 306.

* CAPSULAR. } *adj.* [*capſula*, Lat.] Hollow
* CAPSULARY. } like a cheſt.—It aſcendeth not directly unto the throat, but aſcending firſt into a *capſulary* reception of the breaſt-bone, it aſcendeth again into the neck. *Brown.*

* CAPSULATE. } *adj.* [*capſula*, Lat.] Inclo-
* CAPSULATED. } ſed, or in a box.—Seeds ſuch as are corrupted and ſtale, will ſwim; and this agreeth unto the ſeeds of plants locked up and *capſulated* in their huſks. *Brown's Vulgar Errours.*—The heart lies immured, or *capſulated*, in a cartilage, which includes the heart, as the ſkull doth the brain. *Derham.*

CAPSULE, a receptacle in form of a bag.

(1.) * CAPTAIN. *n. ſ.* [*capitain*, Fr. in Latin *capitaneus*; being one of thoſe who, by tenure *in capite*, were obliged to bring ſoldiers to the war.] 1. A chief commander.—

Diſmay'd not this
Our *captains*, Macbeth and Banquo? *Shakeſp.*

2. The chief of any number or body of men.—Naſhan ſhall be *captain* of Judah. *Numbers.* 3. A man ſkilled in war; as Marlborough was a great *captain*. 4. The commander of a company in a a regiment.—A *captain*! theſe villains will make the name of *captain* as odious as the word occupy; therefore *captains* had need look to it. *Shakeſpeare's Henry* IV.—

The grim *captain*, in a ſurly tone,
Cries out, Pack up, ye raſcals, and be gone!
Dryden.

5. The chief commander of a ſhip.—The Rhodian *captain* relying on his knowledge, and the lightneſs of his veſſel, paſſed in open day, through all the guards. *Arbuthnot on Coins.* 6. It was anciently written *capitain*—

And evermore their cruel *capitain*
Sought with his raſcal routs t'encloſe them round. *Fairy Queen.*

7. *Captain General.* The general or commander in chief of an army. 8. *Captain Lieutenant.* The commanding officer of the colonel's troop or company, in every regiment. He commands as youngeſt captain.

(2.) CAPTAIN BASHAW, or CAPONDAN BASHAW. in the polity of the Turks, ſignifies the Turkiſh high admiral. He poſſeſſes the 3d office of the empire, and is inveſted with the ſame power at ſea that the vizir has on ſhore. He has abſolute authority over the officers of the marine and arſenal, whom he may puniſh, caſhier, or put to death, as ſoon as he is without the Dardanelles. He commands in chief in all the maritime countries, cities, caſtles, &c. and at Conſtantinople, is the firſt magiſtrate of police in the villages on the ſide of the Porte, and the canal of the Black Sea. The mark of his authority is a large Indian cane, which he carries in his hand, both in the arſenal and with the army. He enjoys two ſorts of revenues; the one fixed, the other caſual. The firſt ariſes from a capitation of the iſlands in the Archipelago, and certain governments in Natolia and Galipoli. The latter conſiſts in the pay of all men who die during a campaign; in a fifth of all prizes made by the begs; in the profits accruing from the labour of the ſlaves, whom he hires as rowers to the grand ſignior; and in the contributions he exacts in all places where he paſſes.

(3.) CAPTAIN LIEUTENANT, (§ 1. *def.* 8.) he who, with the rank of captain, but the pay of lieutenant, commands a troop or company in the name of ſome other perſon, who is diſpenſed with on account of his quality from performing the functions of his poſt. Thus the colonel being uſually captain of the firſt company of his regiment, that company is commanded by his deputy as *captain lieutenant*.

(4.) CAPTAIN OF A COMPANY OR TROOP, an inferior officer who commands a company of foot, or a troop of horſe, under a colonel. The duty of this officer is to be careful to keep his company full of able-bodied ſoldiers; to viſit their tents and lodgings, to ſee what is wanting; to pay them well; to cauſe them to keep themſelves neat and clean in their clothes, and their arms bright. He has power in his own company to make ſerjeants, corporals, and lanſpeſades. In the horſe and foot guards, the captains have the rank of lieutenant colonels.

(5.) CAPTAIN OF A MERCHANT SHIP, he who has the direction of the ſhip, her crew, lading, &c. In ſmall ſhips, and ſhort voyages, he is more ordinarly called the *maſter*. In the mediterranean, he is called the *patroon*.—The proprietor of the veſſel appoints the captain or maſter; and he is to form the crew, and chooſe and hire the pilots, mates, and ſeamen; though when the proprietor and maſter reſide on the ſame ſpot, they generally act in concert together.

(6.) CAPTAIN OF A SHIP OF WAR, the officer who commands a ſhip of the line, or a frigate carrying 20 or more cannon. The charge of a captain in the royal navy, is very comprehenſive, as he is not only anſwerable for any bad conduct in the military government, navigation, and equipment of the ſhip he commands, but alſo for any neglect of duty in his inferior officers, whoſe ſeveral charges he is appointed to ſuperintend and regulate. The injunctions laid on him, by the lord high admiral or commiſſioners of the admiralty, are extremely ſtrict; and when a ſhip of war is loſt, whether in conſequence of bad weather, the ſuperior force of an enemy, or from any other cauſe, whether obvious or not, the captain is always tried by a court-martial. This is done that every fact relative to the loſs of the ſhip may be fully aſcertained, and the conduct of the commander ſcrutinized.

(7.) CAPTAIN REFORMED, one who, upon the reduction of the forces, has his commiſſion and company ſuppreſſed; yet is continued captain, either as ſecond to another, or without any command at all.

* CAPTAINRY. *n. ſ.* [from *captain.*] The power over a certain diſtrict; the chieftainſhip.—There ſhould be no rewards taken for *captainries* of counties, no ſhares of biſhopricks for nominating of biſhops. *Spenſer.*

* CAPTAINSHIP. *n. ſ.* [from *captain.*] 1. The condition or poſt of a chief commander.—

Therefore ſo pleaſe thee to return with us,
And of our Athens, thine and ours to take
The *captainſhip*. *Shakeſpeare's Timon.*

2. The rank, quality, or poſt of a captain.—The lieutenant of the colonel's company might well pretend to the next vacant *captainſhip* in the ſame regiment. *Wotton.* 3. The chieftainſhip of a clan, or government of a certain diſtrict.—To diminiſh the Iriſh lords, he did aboliſh their pretended and uſurped *captainſhips*. *Davies on Ireland.* 4. Skill in the military trade.

* CAPTATION. *n. ſ.* [from *capto*, Lat.] The practice of catching favour or applauſe; courtſhip; flattery.—I am content my heart ſhould be diſcovered, without any of thoſe dreſſes, or popular *captations*, which ſome men uſe in their ſpeeches *King Charles.*

CAPTIEUX, a town of France, in the department of Gironde, and chief place of a canton in the diſtrict of Bazas, 3 leagues S. of Bazas.

(1.) * CAPTION. *n. ſ.* [from *capio*, Lat. to take.] The act of taking any perſon by a judicial proceſs.

(2.) CAPTION, in Scots law, 1. a writ iſſuing under his majeſty's ſignet, at the inſtance of a creditor in a civil debt, commanding meſſengers at arms, &c. to apprehend and impriſon the perſon of the debtor until he pay the debt. 2. A writ iſſued by the court of Seſſion againſt the agents of the court, to return papers belonging to proceſſes or law-ſuits, or otherwiſe to go to priſon.

* CAPTIOUS. *adj.* [*captieux*, Fr. *captioſus*, Lat.] 1. Given to cavils; eager to object.—If he ſhew a forwardneſs to be reaſoning about things, take care, that nobody check this inclination, or miſlead it by *captious* or fallacious ways of talking with him. *Locke.* 2. Inſidious; enſnaring.—She taught him likewiſe how to avoid ſundry *captious* and tempting queſtions, which were like to be aſked of him. *Bacon.*

* CAPTIOUSLY. *adv.* [from *captious.*] In a captious manner; with an inclination to object.—Uſe your word as *captiouſly* as you can, in your arguing on one ſide, and apply diſtinctions on the other. *Locke.*

* CAPTIOUSNESS. *n. ſ.* [from *captious.*] Inclination to find fault; inclination to object; peeviſhneſs.—*Captiouſneſs* is a fault oppoſite to civility; it often produces miſbecoming and provoking expreſſions and carriage. *Locke.*

* *To* CAPTIVATE. *v. a.* [*captiver*, Fr. *captivo*, Lat.] To take priſoner; to bring into bondage.—

How ill beſeeming is it in thy ſex,
To triumph like an Amazonian trull,
Upon their woes, whom fortune *captivates?*
Shakeſpeare.

They ſtand firm, keep out the enemy, truth, that would *captivate* or diſturb them. *Locke.* 2. To charm; to overpower with excellence; to ſubdue.—Wiſdom enters the laſt, and ſo *captivate* him with her appearance, that he gives himſelf up to her. *Addiſon, Guardian.* 3. To enſlave: with *to*.—They lay a trap for themſelves, and *captivate* their underſtandings *to* miſtake, falſehood and errour. *Locke.*

* CAPTIVATION. *n. ſ.* [from *captivate.*] The act of taking one captive.

(1.) * CAPTIVE. *adj.* [*captivus*, Lat.] Made priſoner in war; kept in bondage or confinement, by whatever means.—

But fate forbids; the Stygian floods oppoſe,
And with nine circling ſtreams the *captive* ſouls
incloſe. *Dryden.*

(2.) * CAPTIVE. *n. ſ.* [*captif*, Fr. *captivus*, Lat.] 1. One taken in war; a priſoner to an enemy.—

You have the *captives*,
Who were the oppoſites of this day's ſtrife?
Shakeſpeare.

—This is that forced reſpect a *captive* pays to his conquerour, a ſlave to his lord. *Rogers.* 2. It is uſed with *to* before the captor.—

If thou ſay Antony lives, 'tis well,
Or friends with Cæſar, or not *captive to* him.
Shakeſpeare.
My mother, who the royal ſceptre ſway'd,
Was *captive to* the cruel victor made. *Dryd.*

3. One charmed, or enſnared by beauty or excellence.—

My woman's heart
Groſsly grew *captive* to his honey words. *Shak.*

(3.) CAPTIVES formerly became the ſlaves of thoſe who took them; and though ſlavery, ſuch as obtained among the ancients, is now aboliſhed, ſome ſhadow of it ſtill remains in reſpect of priſoners of war, who are accounted the property of their captors. The Romans uſed their captives with great barbarity: their necks were expoſed to the ſoldiers to be trampled on, and their perſons afterwards ſold by public auction. Captives were frequently burnt in the funeral piles of the ancient warriors, as a ſacrifice to the infernal gods. Thoſe of royal or noble blood had their heads ſhaven, and their hair ſent to Rome to ſerve as decorations for female toys, &c. They were led in triumph, loaded with chains, as far as the foot of the Capitoline mount, for they were not permitted to aſcend the ſacred hill, but carried thence to priſon. Thoſe of quality were honoured with golden chains on their hands and feet, and golden collars on their necks. If they made their eſcape, or killed themſelves, to avoid the ignominy of being carried in triumph, their effigies were frequently carried in their place.

* *To* Captive. *v. a.* [from the noun. It was uſed formerly with the accent on the laſt ſyllable, but now it is on the firſt.] To take priſoner; to bring into a condition of ſervitude.—

But being all defeated ſave a few,
Rather than fly, or be *captiv'd*, herſelf ſhe ſlew. *Spenſer.*
What further fear of danger can there be?
Beauty, which *captives* all things, ſets me free. *Dryden.*
Still lay the god: the nymph ſurpriz'd,
Yet, miſtreſs of herſelf, deviſ'd,
How ſhe the vagrant might inthral,
And *captive* him who *captives* all. *Prior.*

(1.) * CAPTIVITY. *n. ſ.* [*captivité*, Fr. *captivitas*, low Lat.] 1. Subjection by the fate of war; bondage; ſervitude to enemies.—

This is the ſerjeant,
Who, like a good and hardy ſoldier, fought
'Gainſt my *captivity*. *Shak.*
There in *captivity* he lets them dwell
The ſpace of ſeventy years; then brings them back;
Rememb'ring mercy. *Milton.*

—The name of Ormond will be more celebrated in his *captivity*, than in his greateſt triumphs. *Dryden.* 2. Slavery; ſervitude.—For men to be tied, and led by authority, as it were with a kind of *captivity* of judgment. *Hooker.*—

When love's well timed, 'tis not a fault to love,
The ſtrong, the brave, the virtuous, and the wiſe,
Sink in the ſoft *captivity* together. *Addiſon.*

(2.) Captivity, in ſacred hiſtory, a puniſhment which God inflicted upon the Iſraelites for their vices and infidelities. The firſt of theſe captivities is that of Egypt, from which Moſes delivered them; after which are reckoned 6 during the government of the judges; but the greateſt were thoſe of Judah and Iſrael, which happened under their kings. It is generally believed, that the ten tribes of Iſrael never returned in a body, after their diſperſion, though individuals of each certainly did. The captivities of Judah are generally reckoned four; the laſt of which fell in A. M. 3416, under Zedekiah: and from this period began the ſeventy years captivity foretold by Jeremiah.

(3.) Captivity, princes of the. Since the deſtruction of Jeruſalem by the Romans, the Jews boaſt that they have always had their particular princes, of the houſe of David, whom they call *princes of the captivity*, in the E. and W. Thoſe in the E. governed the Jews that dwelt in Babylon, Aſſyria, and Perſia; and thoſe in the W. governed thoſe of Judæa, Egypt, Italy, &c. He who reſided in Judæa commonly took up his abode at Tiberias. He preſided in aſſemblies, decided cauſes, levied taxes, and had officers under him. As to the princes of the captivity in the E. they were extinct before the end of the 2d century. Something of this pageantry, however, is ſaid to be ſtill kept up; perhaps that the Jews may be furniſhed with an anſwer to the Chriſtians, when they urge the prophecy of Jacob againſt them: the ſceptre they pretend being ſtill preſerved among them in the head of the captivity. See Æchmalotarcha.

* CAPTOR. *n. ſ.* [from *capio*, to take, Lat.] He that takes a priſoner, or a prize.

* CAPTURE. [*capture*, Fr. *captura*, Lat.] 1. The act or practice of taking any thing.—The great ſagacity, and many artifices uſed by birds, in the inveſtigation and *capture* of their prey. *Derham.* 2. The thing taken; a prize.

(2.) Capture (§ 1. *def.* 2.) is particularly applied to a ſhip taken at ſea. Captures made at ſea were formerly held to be the property of the captors after a poſſeſſion of 24 hours; but the modern authorities require, that before the property can be changed, the goods muſt have been brought into port, and have continued a night *intra præſidia*, in a place of ſafe cuſtody, ſo that all hope of recovering them was loſt.

(3.) Capture is likewiſe uſed for an arreſt or ſeizure of a criminal, debtor, &c. at land.

To Capture, *v. a.* a new verb in very general uſe, and daily occurring in all our news-papers, but which we have not yet met with in any Engliſh Dictionary, not even in that of Dr Aſh, which contains the moſt complete collection of Engliſh words hitherto publiſhed. It ſignifies *to take*, but if its uſe were not in a great meaſure eſtabliſhed by cuſtom, (which often gives ſanction to greater abſurdities,) it would appear as ridiculous, as if one were to ſay of an author who had wrote a new book, that he had *ſcriptured* it. The late prof. Beattie, in his dialogue of the dead, upon the modern innovations on the Engliſh language, (See Blush, § 3.) introduces Mercury, as giving this, among other directions, to Dean Swift, to make Engliſh of the *neweſt* and *beſt pattern*;—"You muſt on no account ſpeak of *taking* the enemy's ſhips, towns, guns, or baggage; it muſt be *capturing*. About 20 years ago, when this word was imported, I heard a ſurly Engliſh ghoſt remark, that ſince his countrymen had learned to talk of *capturing* ſhips, they had loſt the art of *taking* them: but Rodney and Hood have ſince proved that he was miſtaken."

(1.) CAPUA, in ancient geography, a very ancient city of Italy, in Campania, and capital of that diſtrict. It was a ſettlement of the Oſci before the foundation of Rome; as the amazing fertility of the land and a lucrative commerce poured immenſe wealth upon its inhabitants, it became one of the moſt extenſive and magnificent cities in the world. With riches exceſſive luxury crept in, and the Capuans ſoon loſt the power of repelling thoſe nations whom their inſolence had exaſperated. Roman aid was called, but the ſoldiers ſent to defend it wiſhed to make it their prey. Jealous of the avarice and ambition of Rome, the Capuans warmly eſpouſed the quarrel of Carthage: Hannibal made Capua his winter quarters after the battle of Cannæ; and there his hitherto invincible ſoldiers were enervated by pleaſure and indolence. When through a failure of ſupplies from Carthage, Hannibal was under the neceſſity of going to Brutium, and leaving the Capuans to defend themſelves, this city, which had been long inveſted, was ſurrendered at diſcretion to the conſuls Appius Claudius and Q. Fulvius Flaccus. The ſenators were put to death, the nobles impriſoned for life, and all the citizens ſold and diſperſed, except VIBIUS and his friends who killed themſelves. The buildings were ſpared by the victor; and Capua was left to be a harbour for the huſbandmen, a warehouſe for goods, and a granary for corn. Colonies were ſent to inhabit it, and in proceſs of time it regained a degree of its importance. But Genſeric the Vandal was more cruel than the Romans, for he maſſacred the inhabitants, and burnt the town. Narſes rebuilt it; but in 841 it was totally deſtroyed by the Saracens, and the inhabitants driven to the mountains. Since the foundation of the new city, (N° 2.) old Capua has remained in ruins.

(2.) CAPUA, in modern geography, a neat little city of Naples, in Lavoro, built on part of the ſite of old Capua, (N° 1.) It owes its origin to the Lombard inhabitants of the old city, who, ſome time after the departure of the Saracens, ventured down again into the plain; but not deeming their force equal to the defence of their former extenſive circuit, built a ſmaller town on the banks of the Volturno, and on the ſite of the ancient CASILINUM. In 856, Landulph formed here an independent earldom, and in the courſe of a few generations Capua acquired the title of a principality. In the 11th century, the Normans of Averſa expelled the Lombard race of princes, and Richard their chief became prince of Capua. The grandſon of Tancred of Hauteville drove out the deſcendants of Richard, and united this ſtate to the reſt of his poſſeſſions. Capua is at preſent fortified according to the rules of modern art, and may be conſidered as the key of the kingdom; though far removed from the frontier, it is the only fortification that really covers the approach to Naples. It was, however, taken by the French, under Gen. Championet, on the 11th Jan. 1799. It is 15 miles NE. of Naples, and 100 SE. of Rome. Lon. 15. 7. E. Lat. 41. 26. N.

CAPUCHE, *n. ſ.* [Fr. *capuce,*] a friar's cowl.

* CAPUCHED. *adj.* [from *capuce*, Fr. a hood.] Covered over as with a hood.—They are differently cuculleted and *capuched* upon the head and back, and, in the cicada, the eyes are more prominent. *Brown's Vulgar Errours.*

* CAPUCHIN. *n. ſ.* A female garment, conſiſting of a cloak and hood, made in imitation of the dreſs of *capuchin* monks; whence its name is derived.

CAPUCHINS, religious of the order of St Francis in its ſtricteſt obſervance; deriving their name from *capuce*, or *capuchon*, a ſtuff cowl, wherewith they cover their heads. They are clothed with brown or grey; always bare-footed; never go in a coach, nor ever ſhave their beards. They are a reform from the order of Minors, commonly called *cordeliers*, ſet on foot in the 16th century by Matthew Baſchi, who pretended to have been adviſed from heaven, to practiſe the rule of St Francis to the letter. Pope Clement VII, in 1525, gave him permiſſion to retire into ſolitude, with as many others as choſe to embrace the ſtrict obſervance, and in 1528, they obtained his bull. In 1529, the order was brought into complete form; Matthew was elected general, and the chapter made conſtitutions. In 1578, there were 17 general chapters in the order.

CAPUCIATI, an appellation given to the followers of Wickliff in the 14th century, becauſe they did not uncover themſelves before the hoſt.

CAPUENA, in ichthyology, a fiſh caught in the American ſeas, and eſteemed very delicate. It is round ſhaped, and uſually about 5 inches long.

CAPURA, in botany, a genus of the monogynia order, belonging to the hexandria claſs of plants.

(1.) CAPUT, the head. See HEAD.

(2.) CAPUT BARONIÆ the head of the barony, or CAPUT HONORIS, the head of the honour, in ancient cuſtoms, denoted the chief ſeat of a nobleman, where he made his uſual reſidence, and held his court. It could not be ſettled in dowry; nor could be divided among the daughters, in caſe there were no ſon to inherit; but was to deſcend entire to the eldeſt daughter, *cæteris filiabus aliunde ſatisfactis.*

(3.) CAPUT DRACONIS, in aſtronomy, a fixed ſtar of the firſt magnitude, in the head of the conſtellation DRACO, called by the Arabs, ELTANIN, and RASABEN.

(4.) CAPUT GALLINAGINIS, in anatomy, is a kind of ſeptum, or ſpongious border, at the extremities or apertures of each of the *veſiculæ ſeminales*; ſerving to prevent the ſeed coming from one ſide, from ruſhing upon, and ſo ſtopping, the diſcharge of the other.

(6.) CAPUT-LUPINUM, [Lat. *i e.* a wolfiſh head,] a term anciently applied to an outlawed felon, who might be knocked on the head like a *wolf*, by any one that met him; becauſe, having renounced all law, he was to be dealt with as in a ſtate of nature, when every one that ſhould find him might ſlay him. But now, to avoid ſuch inhumanity, it is holden that no man is intitled to kill him wantonly and willfully; but in ſo doing he is guilty of murder, unleſs it is done in the endeavour to apprehend him.

(7.) CAPUT MEDUSÆ, a northern conſtellation included in that of PERSEUS.

(8.) CAPUT MORTUUM, [Lat. *i. e.* a dead head,] a name given to fixed and exhauſted reſiduums remaining in retorts after diſtillations. As theſe reſiduums are very different, according to the ſubſtances diſtilled, and the degree of heat employed, they are by the more accurate modern chemiſts particularly ſpecified by adding a term denoting their qualities; as *earthy reſiduum, charry reſiduum, ſaline reſiduum,* &c.

CAPUTH, a pariſh of Scotland, in Perthſhire, comprehending the greater part of the diſtrict of Stormont, and extending near 13 miles from NW. to SE. in length, and form 1 to 6¼ in breadth; beſides including ſeveral diſtant portions in other pariſhes. The ſoil is partly a light loam and partly a cold wet clay. The climate is dry and healthy, temperate on the banks of the Tay and Iſla, but cold and ſharp on the hills. The Tay ſometimes overflows ſeveral hundred acres. Four great floods happened in 1761, 1780, 1789, and 1791. The N. and W. parts are hilly, and contain quarries of fine blue ſlates. Oats, barley, peaſe, flax, and potatoes are its chief produce. Beſides ſupplying the inhabitants, it exports annually about 4000 bolls of barley. There are ſeveral villages in the pariſh, in one of which a ſtamp-office is eſtabliſhed, where, in general, there are upwards 100,000 yards of linen ſtamped annually. The population in 1801, was 2097. Thirlage ſtill continues and is a bar to improvement.

CAPUTI. See Caledonia, § 3.

CAPYCIUS, or Capece, Scipio, an eminent Italian poet of the 16th century, deſcended of an ancient family in Naples. His chief poem is a philoſophical work on the *Principles of Nature*, printed at Venice, along with another on *St John the Baptiſt*; by Paulus Manutius in 1546.

CAPYS, the father of Anchiſes.

(1.) CAR, or Char, a river of England, which runs into the ſea at Charmouth, in Dorſetſhire.

(2.) Car, a village near Preſcot, Lancaſhire.

(3.) Car, a lake of Ireland, in the county of Armagh, 14 miles SSE. of Armagh.

(4.) * Car, Char, in the names of places, ſeem to have relation to the Britiſh *caer*, a city. *Gibſon.*

(5.) * Car. *n. ſ.* [*car*, Welch: *karre*, Dut. *cræt*, Sax. *carrus*, Lat.] 1. A ſmall carriage of burden, uſually drawn by one horſe or two.—When a lady comes in a coach to our ſhops, it muſt be followed by a *car* loaded with Wood's money. *Swift.* 2. In poetical language, any vehicle of dignity or ſplendour; a chariot of war, or triumph.—

Wilt thou aſpire to guide the heav'nly *car*,
And with thy daring folly burn the world? *Shak.*
See where he comes, the darling of the war!
See millions crowding round the gilded *car*!
Prior.

3. The Charles's wain, or Bear; a conſtellation.—

Ev'ry fixt and ev'ry wand'ring ſtar,
The Pleiads, Hyads, and the Northern *Car.*
Dryden.

CARA, a ſmall iſland of Scotland, lying W. of Kintyre, and 1½ mile S. of Gigha, included in the county of Argyll. It is one mile long and half a mile broad, and abounds with iron ore, and every ſpecies of ſea fowls. By the rev. Mr Fraſer's report to Sir J. Sinclair, it contained 22 inhabitants in 1792. Gigha and Cara conſtitute one pariſh. See Gigha.

CARABARA, a town of Georgia, in Aſia. Lon. 43. 40. E. Lat. 42. 48. N.

CARABAYA, or Caravaya, a diſtrict or juriſdiction of South America, in Buenos Ayres, about 40 leagues in extent; the country is mountainous, but in many places fertile in grain, fruit, and legumes; there are alſo mines of gold and ſilver. St Jean de l'Or is the capital.

(1.) * CARABINE. Carbine. *n. ſ.* [*carbine*, Fr.] A ſmall ſort of fire-arm, ſhorter than a fuſil, and carrying a ball of 24 in the pound, hung by the light horſe at a belt over the left ſhoulder. It is a kind of medium between the piſtol and the muſket, having its barrel two foot and a half long.

(2.) Carabines are ſometimes furrowed ſpirally within, which is ſaid to add to the range of the piece.

* CARABINER. *n. ſ.* [from *carabine*.] A ſort of light horſe carrying longer carabines than the reſt, and uſed ſometimes on foot. *Chalmers.*

CARABUS, in zoology, a genus of inſects belonging to the order of coleoptera, or the beetle kind. See *Plate* L. *fig.* 2. The feelers are briſtly; the breaſt is ſhaped like a heart, and marginated; and the elytra are likewiſe marginated. There are 34 ſpecies of this genus, moſtly diſtinguiſhed by their colour. The moſt remarkable is

Carabus crepitans, the bombardier, with the breaſt, head, and legs, ferruginous or iron-coloured, and the elytra black. It keeps itſelf concealed among ſtones, and ſeems to make little uſe of its wings: when it moves, it is by a ſort of jump; and whenever it is touched, one is ſurpriſed to hear a noiſe reſembling the diſcharge of a muſket, in miniature, during which a blue ſmoke may be perceived to proceed from its anus. It may be made at any time to play off its artillery, by ſcratching its back with a needle. Rolander who firſt made theſe obſervations, ſays it can give 20 diſcharges ſucceſſively. A bladder placed near the anus is the arſenal whence it derives its ſtore, and this is its chief defence againſt an enemy, although the ſmoke emitted ſeems to be altogether inoffenſive, except by cauſing a fright, or concealing its courſe. Its chief enemy is another ſpecies of the ſame genus, but 4 times larger: when purſued and fatigued, the bombardier has recourſe to this ſtratagem, by lying down in the path of the large carabus, which advances with open mouth and claws to ſeize it; but, on this diſcharge of the artillery, ſuddenly draws back, and remains a while confuſed: during which the bombardier conceals himſelf in ſome neighbouring crevice. If he does not find one, the large carabus returns, takes the inſect by the head, and tears it off.

CARAC, a ſmall iſland in the Gulf of Perſia, two leagues S. from the iſland of Cargen.

(1.) CARACALLA, M. Antoninus Baſſianus, ſucceeded his father Severus, on the imperial throne of Rome, A. D. 211, and put the phyſicians to death for not diſpatching him as he would have had them. He killed his brother Geta; and put Papinianus to death, becauſe he would not defend his parricides. He married Julia, his father's widow. Going to Alexandria, he maſſacred almoſt the whole of the inhabitants. See Alexandria, § 4. In ſhort, no fewer than 20,000 perſons were murdered by his orders. At laſt, going from Edeſſa to Meſopotamia, one of his captains ſlew him in the 7th year of his reign.

(2.) Caracalla, in antiquity, a long garment, having a ſort of capuchin, or hood-a top, and reaching to the heels; worn among the Romans by both men and women, in the city and the camp. Spartian and Xiphilin repreſent the emperor Caracalla as the inventor of this garment, and hence ſuppoſe that appellation was firſt given him. Others, with more probability, make the caracalla originally a Gallic habit brought to Rome by that emperor, who firſt enjoined the ſoldiery to wear it, and from whom the people alſo called it *antoninian*. It was a ſort of caſſock, or ſurtout. St Jerom ſays, the caracalla, with a retrenchment of the capuchin, became an eccleſiaſtical garment. It is deſcribed as made of ſeveral pieces cut and ſewed together, and hanging down to the feet.

CARACAO. See Curacao.

(1.) CARACCAS,

(1.) **CARACCAS**, a diſtrict of Terra Firma in South America, belonging to the Spaniards. It is bounded on the N. by the Gulf of Mexico, E. by Communa, and S. by New Granada. The coaſt is rocky and mountainous, interſperſed with ſmall fertile valleys; ſubjected at certain ſeaſons of the year to dry NW. winds, but bleſſed in general with a clear air and wholeſome climate. A great illicit trade is carried on by the Engliſh and Dutch with this province, though the Spaniards have ſcouts perpetually employed, and breaſt-works raiſed in all the valleys. A vaſt number of cocoa trees are cultivated in it. The crop of cocoa amounts to more than 100,000 fanegas, of 110 pounds each. The country of Santa Fe conſumes 20,000; and Europe from 50 to 60,000. The cultivation of the plant employs 10 or 12,000 negroes. Such of them as have obtained their liberty have built a little town called NIRVA, into which they will not admit any white people. This diſtrict alſo produces indigo, ſugar, and tobacco.

(2.) **CARACCAS**, the capital of the above diſtrict, (N° 1.) Dampier ſays it ſtands at a conſiderable diſtance from the ſea; is large, wealthy, and populous; and extremely difficult of acceſs, by reaſon of the ſteep and craggy hills over which an enemy muſt take his route. The bay of Guaira at two leagues diſtance ſerves it for a harbour. Its commerce was long open to all the ſubjects of the Spaniſh monarchy, and is ſtill ſo to the Americans; but the Europeans are not ſo well treated. In 1728, a company was formed at St Sebaſtian, which obtained an excluſive right of maintaining connections with this part of the new world. Four or five ſhips, which they diſpath every year, ſail from thence, and return to Cadiz. Lon. 67. 10. W. Lat. 10. 30. N.

(1.) **CARACCI**, Antony, an eminent hiſtory painter, born in 1583. He ſtudied under Hannibal Caracci, (N° 4.) at Rome, where he died in 1618, aged 35.

(2–4.) **CARACCI**, Lewis, Auguſtin, and Hannibal, 3 celebrated painters of Bologna. Lewis was born in 1555; and was couſin-german to Auguſtin and Hannibal who were brothers, the ſons of a tailor, who gave them a liberal education. They were both diſciples of their couſin Lewis. Auguſtin gained a knowledge of mathematics, natural philoſophy, muſic, poetry, and moſt of the liberal arts: but, though painting was his principal purſuit, he learned the art of engraving from Cornelius Cort, and ſurpaſſed all the maſters of his time. Hannibal never deviated from his pencil. Theſe 3 painters, at length formed a plan of aſſociation, and founded that celebrated ſchool, called *Caracci's academy*. Hither the young ſtudents reſorted to be inſtructed in the rudiments of painting; and here the Caracci taught freely all that came. Lewis's charge was to make a collection of antique ſtatues and bas-reliefs. They had deſigns of the beſt maſters; a collection of curious books on all ſubjects relating to their art; and a ſkilful anatomiſt to teach what belonged to the knitting and motions of the muſcles, &c. There were often diſputations in the academy; and the literati as well as painters, propoſed queſtions, which were always decided by Lewis. Every body was well received; and though ſtated hours were allotted to treat of different matters, yet improvements might be made at all hours by the antiquities and the deſigns which were to be ſeen. The fame of the Caracci reaching Rome, the cardinal Farneſe ſent for Hannibal, to paint the gallery of his palace. Hannibal willingly went, having a great deſire to ſee Raphael's works, with the antique ſtatues, &c. The guſto which he took there from the ancient ſculpture, made him change his Bolognian manner for one more learned, but leſs natural in the deſign and colouring. Auguſtin followed Hannibal, to aſſiſt him in the Farneſe gallery; but the brothers not agreeing, Farneſe ſent Auguſtin to the court of Parma, where he died in 1602, aged 45. His moſt celebrated piece is the communion of St Jerom, in Bologna. In the mean while, Hannibal continued working in the Farneſe gallery at Rome; and, after inconceivable pains and care, finiſhed the paintings in the perfection in which they are ſtill to be ſeen. He hoped that the cardinal would have rewarded him in ſome proportion to the excellence of his work, and the time it took him up, which was 8 years; but the cardinal, influenced by ignorance and avarice, gave him but a little above 200 l. though he doubtleſs deſerved more than twice as many thouſands. When the money was brought him, he was ſo ſurpriſed at the injuſtice done him, that he could not ſpeak a word to the perſon who brought it. This confirmed him in a melancholy, to which his temper naturally inclined, and made him reſolve never more to touch his pencil; which reſolution he had undoubtedly kept, if his neceſſities had not compelled him to break it. It is ſaid that his melancholy gained ſo much upon him, that at times it affected his reaſon. It did not, however, put a ſtop to his amours; and his debauches at Naples, whither he had retired for the recovery of his health, brought a diſtemper upon him, of which he died in 1609, in his 49th year. His veneration for Raphael was ſo great, that it was his deathbed requeſt to be buried in the ſame tomb with him; which was accordingly done in the pantheon at Rome. There are extant ſeveral prints of the Virgin, and ſome other ſubjects etched by him. He is ſaid to have been a friendly, plain, honeſt and open-hearted man; very communicative to his ſcholars; and ſo extremely kind to them, that he generally kept his money in the ſame box with his colours, that they might have recourſe to either as they had occaſion. While Hannibal worked at Rome, Lewis was courted from all parts of Lombardy, eſpecially by the clergy, to make pictures in their churches; and we may judge of his capacity and facility, by the great number of pictures he made. In the midſt of theſe employments Hannibal ſolicited him to come and aſſiſt him in the Farneſe gallery, ſo earneſtly, that he could not avoid complying. He went to Rome; corrected ſeveral things in that gallery; paintd a figure or two himſelf; and then returned to Bologna, where he died in 1619, aged 64.

* **CARACK.** *n. ſ.* [*caraca*, Span.] A large ſhip of burden; the ſame with thoſe which are now

called *galleons*.—In which river, the great *carack* of Portugal may ride afloat ten miles within the forts. *Raleigh*.

(1.) * CARACOLE. *n. ſ.* [*caracole*, Fr. from *caracol*, Span. a ſnail.] An oblique trade, traced out in ſemi-rounds, changing from one hand to another, without obſerving a regular ground— When the horſe advance to charge in battle, they ride ſometimes in *caracoles*, to amuſe the enemy, and put them in doubt, whether they are about to charge them in the front or in the flank. *Farrier's Dict.*

(2.) CARACOLE, in architecture, a ſtair-caſe in a ſpiral form.

* *To* CARACOLE. *v. n.* [from the noun.] To move in caracoles.

CARACOLI, a kind of metal of which the Caribbees, or natives of the Leſſer Antilles, make a ſort of ornament in the form of a creſcent, which they alſo call *caracoli*. It comes from the main land; and the common opinion is, that it is a compound of ſilver, copper, and gold, ſomething like the ancient Corinthian braſs. Theſe metals are ſo perfectly mixed, that the compound, it is ſaid, has a colour that never alters, how long ſoever it remains in the ſea or under ground. But this is quite incredible, if copper makes part of the compound. It is alſo ſaid to be ſomewhat brittle, and that thoſe who work at it are obliged to mix a large proportion of gold with it, to make the compound more malleable. But no mixture of gold, ſilver, and copper will be brittle, unleſs ſome other metal, or ſemi-metal be mixed with them.

(1.) * CARACT. CARAT. *n. ſ.* [*carat*, French.] 1. A weight of four grains, with which diamonds are weighed. 2. A manner of expreſſing the fineneſs of gold.—A mark, being an ounce Troy, is divided into 24 equal parts, called *caracts*, and each *caract* into 4 grains: by this weight is diſtinguiſhed the different fineneſs of their gold; for, if to the fineſt of gold be put two *caracts* of alloy, both making, when cold, but an ounce, or 24 *caracts*, then this gold is ſaid to be 22 *caracts* fine. *Cocker.*—

Thou beſt of gold, art worſt of gold;
Other, leſs fine in *carat*, is more precious. *Shak.*

(2.) CARACT (§ 1. *def.* 1.) is alſo uſed to weigh pearls and other precious ſtones. It is by ſome derived from the Greek κεράτιον the *ſiliqua*, or *carob bean*; each of which may weigh about 4 grains of wheat, whence the Latin *ſiliqua* has been uſed for a weight of 4 grains. The caract grains are ſomething lighter than the grains of other weights. Each of theſe grains is ſubdivided into $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$, and $\frac{1}{64}$.

(3.) CARACT (§ 1. *def.* 2.) is alſo written, *carract*, *carrat*, *karract*, and *karrat*. Kennet derives it from *carecta*, a term which anciently denoted any weight, and came not till of later days to be appropriated to that which expreſſes the fineneſs of gold and the gravity of diamonds. Theſe carats are only imaginary weights. The whole maſs, be the weight what it will, is conceived to be divided into 24 carats; and as many 24th parts as it contains of pure gold, it is called *gold of ſo many carats*, or *ſo many carats fine*. Thus, gold of 18 carats is a mixture, of which 18 parts is pure gold, and the other ſix an inferior metal, &c. This is the common way of reckoning in Europe, and at the gold mines in the Spaniſh Weſt Indies, but with ſome variation in the ſubdiviſion of the carat: among the Germans, it is divided into 12 parts; and by the French, into 32.

CARACTACUS, a renowned king of the ancient Britiſh people called *Silures*, inhabiting South Wales. Having valiantly defended his country 7 years againſt the Romans, he was at laſt defeated; and flying to Cartiſmandua, queen of the BRIGANTES, was by her treacherouſly delivered up to the Romans, and led in triumph to the emperor Claudius then at York; where his noble behaviour, and heroic but pathetic ſpeech, obtained him not only his liberty, but the eſteem of the emperor, A. D. 52. Buchanan, Monipenny, and our other ancient Scots hiſtorians, make this heroic prince one of our Scots monarchs; nephew and ſucceſſor to king Metellanus: and ſay that he was elected general of the united army of Scots, Picts, and Britons.

CARAGACH, in commerce, a kind of cotton that comes from Smyrna.

CARAGANA, bitter vetch. See ERVUM.

CARAGROUCH, in commerce, a ſilver coin of the empire, weighing 9 drachms. It goes at Conſtantinople for 120 aſpers. There are 4 ſorts of them, all of the ſame value.

CARAGUATA, a name given by Plumier to a genus of plants, called by Linnæus TILLANDSIA.

CARAITES. See KARAITES.

CARAMAN, a town of France, in the dep. of the Upper Garonne, and chief place of a canton, in the diſtrict of Rivel, 5 leagues ESE. of Toulouſe.

CARAMANGCE, a Chineſe drug, much eſteemed by the Tonquineſe.

CARAMANIA, a conſiderable province of Aſiatic Turkey, in the S. of Natolia. It comprehends the ancient Pamphilia, and a great part of Cilicia, Piſidia, and Cappadocia. It contains ſeveral lakes, which abound with fiſh, and furniſh great quantities of ſalt. Bajazet II. united it to his empire in 1488. Satalia is the capital.

CARAMANICA, a town of Italy in the kingdom of Naples, and province of Abruzzo Citra, 8 miles N. of Solmona.

(1.) CARAMANTA, a province of S. America, in Terra Firma, extended on both ſides the river Cauca; bounded on the N. by Carthagena, on the E by New Grenada, on the S by Popayan, and on the W. by Popayan and the audience of Panama. It is a valley ſurrounded on every ſide by very high mountains.

(2.) CARAMANTA, the capital of the province, lies on the Cauca, 208 miles NNE. of Popayan. Lon. 72. 15. W. Lat. 5. 18. N.

CARAN, a river in Glouceſterſhire.

CARANDA, in botany. See TAMARINDUS.

CARANGA, an iſland near Bombay, which affords rice, fowls, and goats, for that market.

CARANGES, a diſtrict of Buenos Ayres, 4 leagues in length, and 50 W. from the river Plata. It has ſeveral valuable ſilver mines.

CARANNA. See KARANNA.

CARANTANI, the people of CARINTHIA.

CARANTIA, in botany. See CERATONIA.

CARANTOCK, a village in Cornwall, near Padſtow.

CARANUS, the firſt king of Macedon, and the 7th of the race of the Heraclidæ. See ÆGÆA, and MACEDON.

CARAPACE, the thick, ſolid ſhell, which covers the turtle; and to which adhere thoſe fine tranſparent ſhells, called *tortoiſe ſhells*, of which ſnuff-boxes, &c. are made.

CARAPOPEBA, in zoology, a ſmall ſpecies of lizard, common in the Braſils, and eſteemed poiſonous. Its body is of a liver colour, and has ſeveral white ſpots. There are marks of white on the tail, variegated with yellow. Its eyes are bright and vivid. *Ray.*

(1.) CARARA, a town of Tuſcany, in the principality of Maſſa, celebrated for its quaries of marbles of various colours. It is 5 miles NNE. of Maſſa.

(2.) CARARA, a weight uſed at Leghorn and other parts of Italy, in the ſale of wool and cod fiſh equivalent to 60 pounds of that country.

CARASU, a river of Turkey in Natolia, which riſes in Caramania, croſſes part of Aladula, and falls into the Archipelago,

CARASU MESTRO, a river of European Turkey, in Romania, anciently called NESSUS.

CARASUI, a lake of Bulgaria, formed by a branch of the Danube near its mouth containing ſeveral iſlands.

CARAT. See CARACT, § 1—3.

CARATH, the Arabian name for ACACIA.

CARAVACCA, a town of Spain, in Murica, ſeated among the mountains, near the river Segura, on the confines of Andaluſia and New Caſtile.

CARAVAGGIO, a village of Italy in the Milaneſe, and late republican dep. of the Adda.

(1) * CARAVAN. *n. ſ.* [*caravanne*, Fr. from the Arabick.] A troop or body of merchants or pilgrims, as they travel into the Eaſt.—When Joſeph, and the Bleſſed Virgin Mother had loſt their moſt holy Son, they ſought him in the retinues of their kindred, and the *caravans* of Gallilæan pilgrims. *Taylor.*

(4.) CARAVAN. See KARAVAN.

CARAVANIER, the leader of a karavan.

(1.) * CARAVANSARY. *n. ſ.* [from *caravan*.] A houſe built in the Eaſtern countries for the reception of travellers.—The inns which receive the caravans in Perſia, and the Eaſtern countries, are called by the name of *caravanſaries*. *Spectator.*

(5.) CARAVANSARY. See KARAVENSERA.

CARAVANSERASKIER. See KARAVANSERASKIER.

(1.) CARAVEL, a ſmall veſſel on the coaſt of France, uſed in fiſhing herrings on the banks. They are commonly from 25 to 30 tons burden.

(2.) * CARAVEL. CARVEL. *n. ſ.* [*caravela*, Sp.] A light, round, old faſhioned ſhip with a ſquare poop, formerly uſed in Spain and Portugal.

CARAVI, a ſmall iſland in the Grecian Archipelago. Lon. 41. 22. E. Ferro. Lat. 36. 53. N.

CARAVILLA, a town of Italy, in the kingdom of Naples and country of Moliſe, 12 miles NW. of Moliſe.

CARA VIRZA, a town of Macedonia, in European Turkey. Lon. 22. 32. E. Lat. 40. 23. N.

CARAUSIUS, a celebrated Britiſh prince, who rebelled againſt the Romans, under Carcalla, and fought for the freedom of his country, but was at laſt ſlain by Alectus, about A. D.

* CARAWAY. *n. ſ.* [*carum*, Latin.] A plant; ſometimes found wild in rich moiſt paſtures, eſpecially in Holland and Lincolnſhire. The ſeeds are uſed in medicine and confectionary. *Millar.*

CARAXERON, a name given by Valliant to the globe amaranth. See GOMPHERNA.

CARBASA CARYSTIA, a term uſed by ancient writers for cloth made of the aſbeſtos.

CARBENSIS AQUA, a mineral water of Germany, of which Hoffman from Petzlerus has given a particular account.

CARBEQUI, a copper coin current in the province of Georgia in Aſia; particularly at Teflis.

CARBERRY HILL, a hill in Mid-Lothian, memorable for a battle fought between the adherents of Q. Mary and the aſſociators.

CARBERTON, a town of Nottinghamſhire, in the pariſh of Edenſtow.

(1.) CARBON, a river of European Turkey, in the Morea, anciently called ALPHEUS.

(2.) CARBON, the radical of the carbonic acid. See CHEMISTRY, MINEROLOGY, &c.

* CARBONADO. *n. ſ.* [*carbonnade*, Fr. from *carbo*, a coal, Lat.] Meat cut acroſs to be broiled upon the coals.—If I come in his way willingly let him make a *carbonado* of me. *Shakeſpeare.*

* *To* CARBONADO. *v. a.* [from the noun.] To cut or hack.—

Draw, you rogue, or I'll ſo *carabonado*
Your ſhanks. *Shakeſpeare.*

CARBONARA, a town of Italy, in the kingdom of Naples, and country of Bari, 2 m. SSE. of Bari.

CARBONATES are neuteral ſalts, compoſed of the carbonic acid, and certain baſes. See CHEMISTRY.

CARBONI, a town of Italy, in the kingdom of Naples, and province of Baſilicata, 16 miles SW. from Turſi.

CARBONIFIED, *adj.* or *part.* condemned; diſliked. This word which is not be found in any Engliſh dictionary, we inſert upon the authority of the Earl of Buchan, who thus uſes it, in the introduction to his *Eſſay on the Life of Andrew Fletcher*; (p. xxiii) "to women ſomehow or other, we have been indebted from the beginning, for fortunate revolutions, ſaving in the caſe of Lady Adam; and even that is not *carbonified* by the ſtricteſt theologians."—We have been aſſiſted in diſcovering his lordſhip's meaning by Perſius, who uſes the phraſe *carbone notare*, for, *to diſlike*, or *to condemn.*

CARBONNE, a town of France, in the dep. of Upper Garonne, and chief place of a canton, in the diſtrict of Rieux, 1 league N. of Rieux, and 7 S. of Toulouſe.

CARBRIDGE, a town SW. of Wittney, Oxfordſhire.

CARBROKE, in Norfolkſhire, near Watton.

CARBU, a town of Italy, in the territory of Genoa, 7 miles WNW. of Finale.

(1.) * CARBUNCLE. *n. ſ.* [*carbunculus*, Lat. a little coal.] 1. A jewel ſhining in the dark, like a lighted candle.—It is believed that a *carbuncle* does ſhine in the dark like a burning coal; from whence it hath its name. *Wilkins.*—*Carbuncle* is a ſtone of the ruby kind, of a rich blood red colour. *Woodward.* 2. Red ſpots or pimples breaking out upon the face or body.—It was a peſtilential fever but there followed no *carbuncle*, no purple or livid ſpots or the like, the maſs of the blood not being tainted. *Bacon.*

(2.) CARBUNCLE, in heraldry, a charge or bearing, conſiſting of eight radii, four whereof make a common croſs, and the other four a ſaltier.

(3.) CARBUNCLE, in medicine. See ANTHRAX.

(4.) CARBUNCLE, in natural hiſtory, a very elegant gem, whoſe colour is deep red, with an admixture of ſcarlet. This gem was known among the ancients by the name of *antharax*. It is uſually found pure and of the ſame degree of hardneſs with the ſapphire. It is naturally of an angular figure; and is found adhering, by its baſe, to a heavy and ferruginous ſtone of the emrey kind: its uſual ſize is near a quarter of an inch in length, and two thirds of that in diameter in its thickeſt parts: when held up againſt the ſun, it loſes its deep tinge, and becomes exactly of the colour of a burning charcoal, whence the name. It bears the fire unaltered. It is found only in the Eaſt Indies, and there but very rarely.

* CARBUNCLED. *adj.* [from *carbuncle.*] 1. Set with carbuncles.—

An armour all of gold; it was a king's—
—He has deſerv'd it, were it *carbuncled*
Like holy Phœbus car. *Shakeſpeare.*

2. Spotted; deformed with carbuncles.

* CARBUNCULAR. *adj.* [from *carbuncle.*] Belonging to a carbuncle; red like a carbuncle.

* CARBUNCULATION. *n. ſ.* [*carbunculatio*, Lat.] The blaſting of the young buds of trees or plants, either by exceſſive heat or exceſſive cold. *Harris.*

CARBUNTORIGUM, an ancient fort of Caledonia, mentioned by Ptolemy, and ſuppoſed to have been ſituated on the S. ſide of the pariſh of CAERLAVEROCK, where the veſtiges of a moated triangular caſtle may ſtill be traced, though with ſome difficulty.

CARBURY, a town of Ireland, in Cork.

CARCAJOU, in zoology, a ſpecies of quadrupeds, in North America; ſmall, but very ſtrong and furious: deſcribed by M. Saraſſin, in *Hiſt. Acad. Sc.* 1713.

CARCALTON, or COLSTON, a town in Nottinghamſhire, on the N. ſide of Bingham.

* CARCANET. *n. ſ.* [*carcan*, Fr.] A chain or collar of jewels.—I have ſeen her beſet and bedeckt all over with emeralds and pearls, and a *carcanet* about her neck. *Hakewill on Providence.*

CARCAPULI, the Indian yellow orange of Malabar; a ſpecies of CITRUS.

CARCAR, a town of Spain, in Arragon on the Ega, 3 leagues from Calhora.

(1.) * CARCASS. *n. ſ.* [*carquaſſe*, Fr.] 1. A dead body of any animal.—

Where cattle paſtur'd late, now ſcatter'd lies,
With *carcaſſes* and arms, th' inſanguin'd field,
Deſerted. *Milton.*
The ſcaly nations of the ſea profound,
Like ſhipwreck'd *carcaſſes*, are driven aground. *Dryden.*

2. Body; in a ludicrous ſenſe.—He that finds himſelf in diſtreſs, either of *carcaſs* or of fortune, ſhould deliberate upon the matter, before he prays for a change. *L'Eſtrange* 3. The decayed parts of any thing; the ruins; the remains,—

A rotten *carcaſs* of a boat, not rigg'd,
Nor tackle, ſail, nor maſt. *Shakeſpeare.*

4. The main parts, naked, without completion or ornament; as the walls of a houſe.—What could be thought a ſufficient motive to have had an eternal *carcaſs* of an univerſe, wherein the materials and poſitions of it were eternally laid together? *Hale's Orig. of Mank.* 5. [In gunnery.] A kind of bomb, uſually oblong, conſiſting of a ſhell or caſe, ſometimes of iron, with holes more commonly of a coarſe ſtrong ſtuff, pitched over, and girt with iron hoops filled with combuſtibles, and thrown from a mortar. *Harris.*

(2.) CARCASSES, (§ 1. *def.* 5.) are of an oval figure, and filled with powder, ſaltpetre, ſulphur, broken glaſs, ſhavings of horn, turpentine, tallow, &c. They have 2 or 3 apertures out of which the fire blazes and they are intended to ſet houſes on fire, and do other execution. The name *carcaſs* is derived from the iron hoops which reſemble the ribs of a human carcaſs.

CARCASSONE, an ancient city of France, in the department of Aude, and ci-devant province of Languedoc. It is divided into the upper and lower town, by the river Aude, and both are ſurrounded with walls. The former is ſeated on a hill, and has a caſtle. It is ſtrong, not only by its ſituation on a craggy rock, but alſo by ſeveral large towers which are joined to its walls, and render it of difficult acceſs. The cathedral is very ancient. The lower town is large, and built in the modern taſte. The ſtreets are ſtraight, and lead to a large ſquare in the middle, from whence may be ſeen the 4 gates of the town. It has various cloth manufactures, and an aqueduct. This place ſuffered conſiderably during the cruſade againſt the Albigenſes in the beginning of the 13th century, which affords one of the moſt ſingular inſtances of ſuperſtition and barbarity to be found in the annals of the world. When the royal power was nearly annihilated, during the reigns of the laſt kings of the Carlovingian race in France, moſt of the cities of Languedoc were erected into little independent ſtates, governed by their own princes. Carcaſſone was then under the dominion of viſcounts. When Pope Innocent III. had proſcribed the Albigenſes for hereſy, Raymond the reigning viſcount was included in that proſcription. Simon de Montfort, general of the army of the church, inveſted Carcaſſone, in 1209. The inhabitants, terrified at the fate of other places where the moſt dreadful maſſacres had been committed, demanded leave to capitulate; but this act of mercy was only extended to them under a condition equally cruel, unparalleled, and indeed incredible, if we had not the unanimous teſtimony of all the cotemporary writers. The people were all obliged, without exception of rank or ſex, to evacuate it in a ſtate of nudity; and Agnes, the viſcounteſs, was not exempted though young and beautiful, from this ignominious and ſhocking diſgrace. Carcaſſone is 15 mile W. of Narbonne, and 400 S. of Paris. Lon. 2. 25. E. Lat. 43. 14. N.

* CARCELAGE. *n. ſ.* [from *carcer*, Lat.] Priſon fees. *Dict.*

CARCERES, in the ancient Circenſian games, were incloſures in the circus, wherein the horſes were reſtrained till the ſignal was given for ſtarting.

ing, when by an admirable contrivance, they all at once flew open.

CARCHEMISH, in ancient geography, a town lying upon the Euphrates, belonging to the Aſſyrians, from whom Necho king of Egypt took it. 2 Chr. xxxv. 20. He left a garriſon in it, which was taken and cut to pieces, by Nebuchadnezzar king of Babylon. 2 Kings xxiii. 29. Iſaiah (x. 9.) ſeems to ſay, that Tiglath-pileſer had made a conqueſt of it. It is thought to be the ſame with Circesium.

CARCHESSUM, in ſurgery, a bandage.

CARCINIUM opalinum, a genus of marine animals, diſcovered by Mr Banks and Dr Solander, in their paſſage to Madeira, which ſhone in the water with colours that exceeded in variety and brightneſs any thing they had ever ſeen. The beautiful colouring and ſplendour of theſe animals were equal to thoſe of an opal; and from their reſemblance to that gem, they gave this denomination to the genus. One of them lived ſeveral hours in a glaſs of ſalt water, ſwimming about with great agility, and diſplaying at every motion a change of colours almoſt infinitely various.

(1.) * CARCINOMA. *n.ſ.* [from *καρκινος*, a crab.] A particular ulcer, called a cancer, very difficult to cure. A diſorder likewiſe in the horny coat of the eye, is thus called. *Quincy.*

(2.) Carcinoma. See Cancer, § III.

* CARCINOMATOUS. *adj.* [from *carcinoma.*] Cancerous; tending to a cancer.

CARCLEW, a village of Cornwall, 2 miles from Penryn.

CARCUS, or Carcass. See Carcass, § 2.

(1.) * CARD. *n.ſ.* [*carte*, Fr. *charta*, Lat.] 1. A paper painted with figures uſed in games of chance or ſkill.—

Soon as ſhe ſpreads her hand, th' aerial guard
Deſcend, and ſit on each important *card;*
Firſt, Ariel perch'd upon a matadore. *Pope.*

2. The paper on which the winds are marked under the mariner's needle.—

Upon his *cards* and compaſs firm his eye,
The maſters of his long experiment. *Spenſer.*
The very points they blow;
All the quarters that they know,
I' th' ſhipman's *card.* *Shakeſpeare.*

3. [*kaarde*, Dutch.] The inſtrument with which wool is combed, or comminuted, or broken for ſpinning.

(2.) Card is alſo uſed for a ſhort letter of buſineſs or compliment. Dr Aſh ſtiles it, in this ſenſe, an *unſealed paper;* but cards upon all ſubjects are as often ſent ſealed as otherwiſe. The chief diſtinction, (beſides brevity) eſtabliſhed by etiquette, between cards and letters, is, that the former are wrote entirely in the *third* perſon, whereas the firſt and ſecond perſons are always uſed in the latter.

(3.) Card, (§ 1. *def.* 3.) conſiſts of a block of wood, beſet with ſharp teeth, ſerving to arrange the hairs of wool, flax, hemp, and the like. There are different kinds of them, as hand cards, ſtock cards, &c. They are made thus: A piece of thick leather, of the ſize intended for the card, is ſtrained in a frame, and then pricked full of holes, into which pieces of iron wire are inſerted for teeth. The leather is then nailed by the edges to a flat piece of wood, in the form of an oblong ſquare, about a foot in length and half a foot in breadth, with a handle placed in the middle of one of the longer ſides. The teeth are thus made: The wire being drawn to the ſize intended, a number of wires are cut into proper lengths by means of a gauge, and then doubled in a tool contrived for that purpoſe; after which they are bent into the proper direction by means of another tool; and then placed in the leather.

(4.) Cards, among gameſters, (§ 1. *def.* 1.) little pieces of fine thin paſteboard of an oblong figure, of ſeveral ſizes; but moſt commonly in Britain, 3½ inches long and 2¼ broad, on which are painted ſeveral points and figures. The moulds and blocks for making cards are exactly like thoſe that were uſed for the firſt printed books. They lay a ſheet of wet or moiſt paper on the blocks, which is firſt ſlightly done over with a ſort of ink made of lamp black diluted in water, and mixed with ſome ſtarch to give it a body. They afterwards rub it off with a round liſt. The court cards are coloured by means of ſeveral patterns, ſtyled *ſtane files.* Theſe conſiſt of papers cut through with a penknife; and in theſe apertures they apply ſeverally the various colours, as red, black, &c. Theſe patterns are painted with oil colours, that the bruſhes may not wear them out; and when the pattern is laid on the paſteboard, they ſlightly paſs over it a bruſh full of colour, which leaving it within the openings, forms the face or figure of the card.

(5.) Cards, deceptions with. See Legerdemain.

(6.) Cards, false. Among ſharpers, divers ſorts of fraudulent cards have been contrived: as, 1. *Marked* cards, where the aces, kings, queens, and knaves, are marked on the corners of the backs with ſpots of different number and order, either with clear water, or water tinged with pale Indian ink, that thoſe in the ſecret may diſtinguiſh them. Aces are marked with ſingle ſpots on two corners oppoſite diagonally; kings with two ſpots at the ſame corners; knaves with the ſame number tranſverſed. 2. *Breef* cards, thoſe which are longer or broader than the reſt; chiefly uſed at whiſt and piquet. The broad cards are uſually for kings, queens, knaves, and aces; the long for the reſt. Their deſign is to direct the cutting, to enable the perſon in the ſecret to cut the cards diſadvantageouſly to his adverſary, and draw the perſon unacquainted with the fraud to cut them favourably for the ſharper. As the pack is placed either endwiſe or ſidewiſe to him that is to cut, the long or broad cards naturally lead him to cut to them. Breef cards are ſometimes made thus by the manufacturer; but, in defect of theſe, ſharpers pare all but the breefs with a pen-knife or razor. 3. *Corner bend,* denotes four cards turned down finely at the corner to ſerve as a ſignal to cut by. 4. *Middle bend,* or Kingſton Bridge, is where the tricks are bent two different ways, which cauſes an opening or arch in the middle, to direct likewiſe the cutting.

(7) Cards, origin of. Cards were invented about A. D. 1390, to divert Charles VI. of France, who had fallen into melancholy. The inventor propoſed, by the figures of the four ſuits or colours, as the French call them, to repreſent the

four claſſes of men in the kingdom. By the *cœurs* (hearts) are meant the *gens de choeur*, choir-men, or eccleſiaſtics; and therefore the Spaniards, who certainly received the uſe of the cards from the French, have *copas*, or chalices inſtead of hearts. The nobility or prime military part of the kingdom, are repreſented by the ends or points of lances or pikes; and our ignorance of the meaning or reſemblance of the figure induced us to call them *ſpades:* The Spaniards have *eſpadas*, ſwords, in lieu of pikes, which are of a ſimilar import. By diamonds are deſigned the order of citizens, merchants, or tradeſmen, *carreaux*, (ſquare ſtones, tiles, or the like:) The Spaniards have a coin, *dineros*, which anſwers to it; and the Dutch call the French word *carreaux*, "*ſtrenneen*," ſtones and diamonds, from the form. *Trefle*, the trefoil leaf, or clover graſs, (corruptly called *clubs*) alludes to the huſbandmen and peaſants. But how this ſuit came to be called *clubs*, is not eaſily explained; unleſs borrowing the game from the Spaniards, who have *baſtos*, (ſtaves or clubs) inſtead of the trefoil, we give the Spaniſh ſignification to the French figure. The four kings are David, Alexander, Cæſar, and Charles; the names were then, and (if they are not lately changed for republican names) ſtill are, on the French cards. Theſe repreſent the four monarchies of the Jews, Greeks, Romans, and Franks under Charlemagne. The queens are Argine, Eſther, Judith, and Pallas, typical of birth, piety, fortitude, and wiſdom, the qualifications reſiding in each perſon. *Argine* is an anagram for *regina*, queen by deſcent. By the knaves, were deſigned the ſervants to knights, for *knave* originally meant only *ſervant;* others fancy that the knights themſelves were deſigned by thoſe cards; becauſe *Hogier* and *Labire*, two names on the French cards, were famous knights at the time cards were ſuppoſed to have been invented.

(1.) * *To* CARD. *v. a.* [from the noun.] To comb or comminute wool, with a piece of wood, thick ſet with crooked wires.—

The while their wives do ſit
Beſide them, *carding* wool. *May's Virgil.*

(2.) * *To* CARD. *v. n.* To game; to play much at cards: as, a *carding* wife.

CARDAMINDUM, in botany, a name given by Tournefort to the TROPÆOLUM of Linnæus.

CARDAMINE, in botany, *lady's ſmoke;* a genus of the ſiliquoſa order, belonging to the tetradynamia claſs of plants; and in the natural method ranking under the 39th order, Siliquoſa. The ſiliqua parts aſunder with a ſpring, and the valves roll ſpirally backward; the ſtigma is entire, and the calyx a little gaping. Of this there are 15 ſpecies; but the moſt remarkable is the

CARDAMINE PRATENSIS, with a large purpliſh flower. It grows naturally in many parts of Britain, and is alſo called *cuckow-flower*. There are 4 varieties, viz. the ſingle, with purple and white flowers, which are frequently intermixed in the meadows; and the double, of both colours. The ſingle ſorts are not admitted into gardens; but the double deſerve a place, as making a pretty appearance during the time they are in flower. They will thrive in a moiſt ſhady border; and are propagated by parting their roots in autumn. They delight in a ſoft loamy ſoil, but not too ſtiff. By ſome they are reckoned antiſcorbutic.

(1.) * CARDAMOMUM. *n. ſ.* [Latin.] A medicinal ſeed, of the aromatic kind, contained in pods, and brought from the Eaſt Indies. *Chamb.*

(2.) CARDAMOMUM. See AMOMUM, N° 1.

CARDAN, Jerom, one of the moſt extraordinary geniuſes of his age, was born at Pavia, 24th Sept. 1501. As his mother was not married, ſhe tried every method to procure an abortion, but without effect. She was three days in labour, and they were at laſt obliged to cut the child from her. He was born with his head covered with black curled hair. When 4 years old, he was carried to Milan, where his father was an advocate. At 20, he went to ſtudy in the univerſity, and two years afterwards he explained Euclid. In 1523, he went to Padua, and was admitted M. A. and in 1525, M. D. He married about 1531. For ten years before he had been impotent, which was a great mortification to him. He attributed it to the evil influences of the planet under which he was born. When he enumerates the greateſt misfortunes of his life, this 10 years impotency is always one. At the age of 32 he became profeſſor of mathematics at Milan. In 1539, he was admitted member of the college of phyſicians at Milan; in 1543, he read public lectures of medicine in that city, and at Pavia in 1544; but diſcontinued theſe becauſe he could not get payment of his ſalary, and returned to Milan. In 1552, he went into Scotland, having been ſent for by the Abp. of St Andrews, who had in vain applied to the French king's phyſicians, and thoſe of the emperor. This prelate, then 40 years old, had for 10 years been afflicted with a ſhortneſs of breath, which returned every 8 days for the 2 laſt years. He began to recover from the moment that Cardan preſcribed for him. Cardan took leave of him at the end of ſix weeks and three days, leaving him preſcriptions which in two years wrought a complete cure. Cardan in his journey to Scotland croſſed France; and returned through Germany and the Netherlands, along the Rhine. On this occaſion he went to London, and calculated king Edward's nativity. This tour took up about four months: after which, returning to Milan, he continued there till October 1552; then went to Pavia, from whence he was invited to Bologna in 1562. He taught in this city till 1570; but left it in 1571, and went to Rome, where he lived for ſome time without public employment. He was, however, admitted a member of the college of phyſicians, and received a penſion from the pope. He died at Rome, 21ſt Sept. 1575, according to Thuanus. This account might be ſufficient to ſhew the reader that Cardan was of a very fickle temper; but he will have a much better idea of his odd turn of mind from what he himſelf has written concerning his own good and bad qualities. He paid himſelf congratulatory compliments for not having a friend in this world; but that, in requittal, he was attended by an aerial ſpirit, emanated partly from Saturn and partly from Mercury, who was the conſtant guide of his actions. He declared, too, that he was ſo irregular in his manner of walking the ſtreets, as induced all beholders to point at him as a fool.

Sometimes he walked very ſlowly, like a man abſorbed in profound meditation; then all on a ſudden quickened his ſteps, accompanying them with very abſurd attitudes. In Bologna his delight was to be drawn about in a mean vehicle with 3 wheels. When nature did not viſit him with any pain, he would procure to himſelf that diſagreeable ſenſation by biting his lips ſo wantonly, or pulling his fingers to ſuch a vehement degree, as ſometimes to force the tears from his eyes: and the reaſon he aſſigned was to moderate certain impetuous ſallies of the mind, the violence of which was to him more inſupportable than pain itſelf; and that the ſure conſequence of ſuch a ſevere diſcipline was the enjoying the pleaſure of health. He ſays that, in his greateſt tortures of ſoul, he uſed to whip his legs with rods, and bite his left arm; that it was a great relief to him to weep, but that very often he could not; that nothing gave him more pleaſure than to talk of things which made the whole company uneaſy; that he ſpoke on all ſubjects, in ſeaſon and out of ſeaſon; and he was ſo fond of games of chance, as to ſpend whole days in them, to the great prejudice of his family and reputation, for he even ſtaked his furniture and his wife's jewels. He owns that he was revengeful, envious, treacherous, a dealer in the black art, a backbiter, a calumniator, and addicted to all the deteſtable exceſſes that can be imagined: yet, notwithſtanding ſo humbling a declaration, there was never perhaps a vainer mortal, or one that with leſs ceremony expreſſed the high opinion he had of himſelf. "I have been admired (ſays he) by many nations: an infinite number of panegyrics, both in proſe and verſe, have been compoſed to celebrate my fame. I was born to releaſe the world from the manifold errors under which it groaned. What I have found out could not be diſcovered either by my predeceſſors or my cotemporaries; and that is the reaſon why thoſe authors who write any thing worthy of being remembered, ſcruple not to own that they are indebted to me for it. I have compoſed a book on the dialectic art, in which there is neither one ſuperfluous letter nor one deficient. I finiſhed it in 7 days, which ſeems a prodigy. Yet where is there a perſon to be found, that can boaſt of his having become maſter of its doctrines in a year? And he that ſhall have comprehended it in that time, muſt appear to have been inſtructed by a familiar dæmon." The ſame capriciouſneſs obſervable in his outward conduct appears in his works. In moſt of his treatiſes, the reader is ſtopped almoſt every moment either by the obſcurity of his text, or his digreſſions. In his arithmetical performances, there are ſeveral diſcourſes on the motions of the planets, the creation, and the tower of Babel. In his dialectic work, we find his opinions of hiſtorians and the writers of epiſtles. The only apology which he makes for his frequent digreſſion is, that they were done for the ſooner filling up of his ſheet, his bargain with the bookſeller being at ſo much per ſheet; and that he worked as much for his daily ſupport as for the acquiſition of glory. The Lyons edition of his works, printed in 1663, conſiſts of 10 vols folio. He revived in latter times all the ſecret philoſophy of the cabaliſts, which filled the world with ſpirits; a likeneſs to whom, he aſſerted, we might attain by purifying ourſelves with philoſophy. He choſe for himſelf, however, notwithſtanding ſuch reveries, this fine device, *Tempus mea poſſeſſio, tempus meus ager:* "Time is my ſole poſſeſſion, and the only fund I have to improve." In fact, with all his oddities, we muſt allow, that Cardan cultivated every ſpecies of knowledge, and made a greater progreſs in philoſophy, medicine, aſtronomy, mathematics, &c. than the greateſt part of his cotemporaries who had applied their minds but to one of thoſe ſciences. Scaliger affirms, that Cardan, having fixed the time of his death, abſtained from food, that his prediction might be fulfilled, and that his continuance to live might not diſcredit his art. Cardan's father, who was a doctor of medicine, and a profeſſor of civil and canon law, died in the ſame manner, in 1524, having abſtained from all ſuſtenance for 9 days. His ſon tells us, that he had white eyes, and could ſee in the night.

CARDAS, 1. a ſort of card, proper for carding flocks of ſilk, to make cappadine: 2. The name which the French give to thoſe flocks of ſilk: 3. A large card uſed in the cloth manufactories of Languedoc, for carding the dyed wool, to make cloth of mixed colours.

CARDEN, a town in Cheſhire, NW. of Malpas.

CARDANERO, a river of Spain, in Catalonia.

CARDEN HALL, in Cumberland, S. of Carliſle.

(1.) * CARDER. *n. ſ.* [from *card.*] 1. One that cards wool.—

The clothiers all have put off
The ſpinſters, *carders*, fullers, weavers. *Shak.*

2. One that plays much at cards.

(2.) CARDERS, ſpinners, weavers, fullers, ſheermen, and dyers, not performing their duty in their occupations, incur double damages; to be committed until payment. One juſtice to hear and determine complaints. Carders, combers, ſorters, ſpinners, or weavers, conveying away, embezzling or detaining any wool or yarn, delivered by the clothier, or any other perſon, ſhall give the party grieved ſuch ſatisfaction, as two juſtices, mayor, &c. ſhall think fit: if not able or willing to make ſatisfaction, for the firſt offence to be whipped, or ſet in the ſtocks in ſome market town, or in any other town where the offence is committed: the ſecond offence to incur the like, or ſuch further puniſhment by whipping, &c. as juſtices ſhall think proper. Conviction by one witneſs on oath, or confeſſion.

BARDI, Lewis, an Italian painter, called alſo CIVOLI, or CIGOLI, from the place of his birth, was born, in 1559. His *ecce homo*, which he performed as a trial of ſkill with Barochia and Michael Angelo de Carravaggio, was judged better than thoſe executed by them. He excelled in deſigning, and was employed by the popes and princes of his time. He died at Rome in 1763.

CARDIACA, in botany. See LEONURUS.

* CARDIACAL. } *adj.* [καρδια, the heart.]
(1.) * CARDIACK. } Cordial; having the quality of invigorating the ſpirits.

(2.) CARDIACS, medicines beneficial to the heart, whether internally or externally applied; particularly thoſe which raiſe the ſpirits, and give preſent ſtrength and cheerfulneſs; commonly called CORDIALS. Cardiacs were anciently ſuppoſed to exert themſelves immediately in comforting and ſtrengthening the heart: but modern phyſicians rather ſuppoſe them to produce the effect by putting the blood into a gentle fermentation, whereby the ſprings, before decayed, are repaired and invigorated, and the tone and elaſticity of the fibres of the veſſels reſtored; and thus occaſioning a more eaſy and briſk circulation.

CARDIALGIA. See MEDICINE, *Index*.

* CARDIALGY. *n. ſ.* [from καρδια, the heart, and αλγος, pain.] The heart-burn; a pain ſuppoſed to be felt in the heart, but more properly in the ſtomach, which ſometimes riſes all along from thence up to the æſophagus, occaſioned by ſome acrimonious matter. *Quincy.*

CARDIFF, or CAERDIFF, a town of S. Wales, in Glamorganſhire, ſeated on the river Tave, in a rich and fruitful ſoil. It is a large, compact, well-built town, having a caſtle, a wall, and four gates, built by Robert Fitz-Hamon, a Norman, about A. D. 1100. It is governed by the conſtable of the caſtle, 12 aldermen, 12 burgeſſes, &c. and ſends one member to parliament. Here the aſſizes and ſeſſions are held, beſides ſeveral courts. There is a handſome bridge over the river, to which ſmall veſſels come to take in their lading. It has now only one church, St Mary's having been long ago thrown down by the undermining of the river. The caſtle, though much decayed, ſtill makes a grand appearance, and the walls are very ſtrong and thick. The church has a fine ſteeple, and the town hall is a good ſtructure. The magiſtrates are elected every year by the majority of the burgeſſes. Near the town are ſome iron-works, and a canal extending 25 miles to the iron-works at Merthyr-Tidvil. Cardiff lies 12 miles E. of Cowbridge, and 164 W. of London. Lon. 3. 12. W. Lat. 51. 30. N.

(1.) CARDIGAN, or CARDIGANSHIRE, a county of South Wales, bounded on the N. by Merionethſhire and Montgomeryſhire, on the E. by Radnorſhire and Brecknockſhire, on the W. by the Bay (N° 3.) and on the S. by Caermarthenſhire. Its length from NW. to SE. is about 44 miles, and its breath near 20. The air, as in other parts of Wales, varies with the ſoil, which in the ſouthern and weſtern parts is more upon a level than this principality generally is, which renders the air mild and temperate. On the S. and W. it is fertile; but on the N. and E. mountainous, barren and bleak. However, there are cattle bred in all parts; but they have neither wood nor coals of their own for fuel: they have rich lead mines, and fiſh in plenty, with fowls both tame and wild. The principal rivers are the Tyvy, the Ridol, and the Iſtwith. This county has 5 market towns, viz. Cardigan, Aberiſtwith, Lianbadarnvawn, Llanbedar, and Tregaron, with 64 pariſhes; and was formerly computed to have upwards of 3000 houſes, and 250,000 acres of land. It ſends two members to parliament; one for the county and one for the town. The mountains abound with ſilver and lead ores, which have been wrought with advantage.

(2.) CARDIGAN, the capital of the county (N° 1) is ſeated near the mouth of the river Tyvy, on the Iriſh channel. It is of conſiderable ſize and well built, containing 3 wards, one church and the county goal. It is governed by a mayor, 13 aldermen 13 common council-men, &c. Here are the ruins of a caſtle which was built by Gilbert de Clare, about A. D. 1160. It has markets, on Tueſ. and Sat. It is 33 NE. by E. of St David's; and 225 WNW. of London. Lon. 4. 38. W. Lat. 52. 10. N.

(3.) CARDIGAN BAY, a bay of S. Wales; at the mouth of the Tave, extending to Barſey iſland in Caernarvonſhire. It is 40 miles long, and affords good ſhelter for ſhips.

(1.) * CARDINAL. *adj.* [*cardinalis*, Lat.] Principal; chief.—The diviſions of the year in frequent uſe with aſtronomers, according to the *cardinal* interſections of the zoadiac; that is the two equinoctials, and both the ſolſtitial points *Brown.*—His *cardinal* perfection was induſtry. *Clarendon.*

(2.) * CARDINAL. *n. ſ.* One of the chief governours of the Romiſh church, by whom he pope is elected out of their own number, which contains 6 biſhops, 50 prieſts, and 14 deacons, who conſtitute the ſacred college, and are choſen by the pope.—A *cardinal* is ſo ſtiled, becauſe ſerviceable to the apoſtolical ſee, as an axle or hinge on which the whole government of the church turns; or as they have from the pope's grant, the hinge and government of the Romiſh church. *Ayliffe.*

(3.) CARDINAL, ACCOUNT OF THE ORIGIN AND OFFICE OF. Some ſay the cardinals were ſo called from the Latin *incardinatio*, which ſignifies the adoption in any church made of a prieſt of a foreign church, driven thence by misfortune; and add, that the uſe of the word commenced at Rome and Ravenna; the revenues of the churches of which cities being very great, they became the common refuge of the unhappy prieſts of all other churches. The cardinals compoſe the pope's council or ſenate: in the Vatican is a conſtitution of pope John, which regulates the rights and titles of the *cardinals*; and which declares, that as the pope repreſents Moſes, ſo the cardinals repreſent the 70 elders, who, under the pontifical authority, decide private differences. Cardinals, in their firſt inſtitution, were only the principal prieſts of the pariſhes of Rome. In the primitive church, the chief prieſt of a pariſh, next the biſhop was called *preſbyter cardinalis*, to diſtinguiſh him from the other petty prieſts, who had no church. The term was firſt applied to them in A. D. 150; others ſay, 300. Under pope Gregory, cardinal prieſts, and deacons, were only ſuch as had a church or chapel under their care: and this was the original uſe of the word. Leo IV. in the council of Rome, held in 853, calls them *preſbyteros ſui cardinis;* and their churches, *parochias cardinales*. The cardinals continued on this footing till the 11th century: but as the grandeur of his holineſs became then exceedingly augmented, he would have his council of cardinals make a better figure than the ancient prieſts had done. It was a good while, however, before they had the precedence over biſhops, or got the election of the pope into their hands; but they ſoon after got the red hat and purple; and became at length ſuperior to the biſhops, by the ſole quality of being cardinals. Du-Cange obſerves, that originally there were 3 kinds of churches: the firſt or genuine churches were properly called *pariſhes*; the 2d deaconries, which were chapels joined to hoſpitals, and ſerved by deacons; the 3d *oratories*, where private maſſes were ſaid, and were diſcharged by local and reſident chaplains. He adds, that to diſtinguiſh the principal churches from the chapels and oratories, the name *cardinales* was given to them. Accordingly, pariſh churches gave titles to cardinal prieſts; and ſome chapels alſo, at length, gave the title of *cardinal deacons*. Others are of opinion, that the title was given not only to prieſts, but likewiſe to ſuch biſhops and deacons as were attached to certain churches, to diſtinguiſh them from thoſe who only ſerved them *en paſſant*, and by commiſſion. Titular churches, or benefices, were a kind of pariſhes, i. e. churches aſſigned each to a cardinal prieſt; with ſome ſtated diſtrict, and a font for adminiſtering baptiſm, in caſes where the biſhop himſelf could not do it. Theſe cardinals were ſubordinate to the biſhops; and accordingly, in councils, particularly that held at Rome in 868, ſubſcribed after them. It was not, however, only at Rome, that prieſts bore this title; for there were cardinal prieſts in France: thus, the curate of the pariſh of St John de Vignes is called in old charters the *cardinal prieſt* of that pariſh. The title is alſo given to ſome biſhops, *quatenus* biſhops; e. g. to thoſe of Mentz and Milan: the archbiſhop of Bourges is alſo, in ancient writings, called *cardinal*. The *ſacred college* conſiſts of 70 cardinals, divided into 3 claſſes; viz. biſhops, prieſts, and deacons. See § 2. The cardinal biſhops, who are the pope's vicars, bear the titles of the biſhoprics aſſigned to them; the reſt take ſuch titles as are given them: the number of cardinal biſhops has been fixed; but that of cardinal prieſts and deacons, and conſequently the ſacred college itſelf, has often fluctuated. Till 1125, the college only conſiſted of 52 or 53: the council of Conſtance reduced them to 24; but Sixtus IV. about 1480, raiſed them again to 53, and Leo X. to 65. Thus, as the number of cardinal prieſts was anciently fixed to 28, new titles were to be eſtabliſhed, in proportion as new cardinals were created. The cardinal deacons were originally no more than 7, for the 14 quarters of Rome; but they were afterwards increaſed to 19, and after that were again diminiſhed. Pope Pius IV. enacted, in 1562, that the Pope ſhould be choſen only by the ſenate of cardinals. Some ſay, the election of the pope reſted in the cardinals, excluſive of the clergy, in the time of Alexander III. in 1160. Others go higher ſtill, and ſay, that Nicholas II. having been elected at Sienna, in 1058, by the cardinals alone, occaſioned the right of election to be taken from the clergy and people of Rome; only leaving them that of confirming him by their conſent; which was at length, likewiſe taken from them. At the creation of a new cardinal, the pope performs the ceremony of opening and ſhutting his mouth; which is done in a private conſiſtory. The ſhutting his mouth implies the depriving him of the liberty of giving his opinion in congregations; and the opening his mouth, which is performed 15 days after, ſignifies the taking off this reſtraint. If the pope happens to die during the time a cardinal's mouth is ſhut, he can neither give his voice in the election of a new pope, nor be himſelf advanced to that dignity. The dreſs of a cardinal is a red ſoutanne, a rocket, a ſhort purple mantle, and a red hat. The cardinals began to wear the red hat at the council of Lyons, in 1243. The decree of pope Urban VIII. whereby it is appointed, that the cardinals be addreſſed under the title of *eminence*, is dated 1630; till then, they were called *illuſtriſſimi*. When cardinals are ſent to the courts of Princes, it is in quality of legates *a latere*; and when they are appointed governors of towns, their government is called by the name of *legation*.

(4.) **CARDINAL FLOWER**, in botany. See LOBELIA.

(5.) **CARDINAL NUMBERS**, in grammar, are the numbers *one*, *two*, *three*, &c. in diſtinction from the ordinal numbers, *firſt*, *ſecond*, *third*, &c.

(6.) **CARDINAL POINTS**, in aſtrology, are the riſing and ſetting of the ſun, the zenith, and nadir.

(7.) **CARDINAL POINTS**, in coſmography, are the 4 interſections of the horizon with the meridian, and the prime verticle circle. Of theſe, two, viz. the interſections of the horizon and meridian, are called *North* and *South*, with regard to the poles they are directed to. The other two, viz. the interſections of the horizon, and firſt vertical, are called *Eaſt* and *Weſt*. The cardinal points, therefore, coincide with the four cardinal regions of the heavens; and are 90° diſtant from each other. The intermediate points are called *collateral*.

(8.) * **CARDINAL'S FLOWER.** *n. ſ.* [*rapuntium*, Lat.] A flower.—The ſpecies are, 1. Greater rampions, with a crimſon ſpiked flower, commonly called the ſcarlet *cardinal's flower*. 2. The blue *cardinal's flower*. The firſt ſort is greatly prized for the beauty of its rich crimſon flowers, exceeding all flowers in deepneſs. *Miller.*

(9.) **CARDINAL SIGNS**, in aſtronomy, are Aries, Cancer, Libra, and Capricorn.

(10.) **CARDINALS, SECULAR.** The name has alſo been applied to ſecular officers. Thus, the prime miniſters in the court of the emperor Theodoſius, are called *cardinales*. Caſſiodorus, lib. vii. formul. 31. makes mention of the cardinal prince of the city of Rome; and in the liſt of officers of the duke of Bretagne, in 1447, we meet with one Raoul de Thorel, cardinal of Quillart, chancellor, and ſervant of the viſcount de Rohan: which ſhows it to have been an inferior quality.

(11.) **CARDINAL VIRTUES.** Juſtice, prudence, temperance, and fortitude, are called the 4 cardinal virtues, as being the baſis of all the reſt.

(12.) **CARDINAL WINDS** are thoſe that blow from the cardinal points.

* CARDINALATE. } *n. ſ.* [from *cardinal*.]
* CARDINALSHIP. } The office and rank of a cardinal.—An ingenious cavalier, hearing that an old friend of his was advanced to a *cardinalate*, went to congratulate his eminence upon his new honour. *L'Eſtrange.*

CARDINGHAM, a village in Cornwall, NE. of Bodmin.

CARDINGTON, 2 ſmall towns; viz. 1. SE. of Bedford: 2. between Biſhop's Caſtle and Wenlock, Salop.

CARDIOID, in the higher geometry, an algebraical curve, ſo called from its reſemblance to an heart.

CARDIOSPERMUM, in botany, HEART PEA, a genus of the trigynia order, belonging to the octandria claſs of plants; and in the natural method ranking under the 39th order, *Tribilatæ*. The calyx is tetraphyllous, the petals 4, the nectarium tetraphyllous and unequal; the capſules 3, grown together, and inflated. There are two ſpecies, natives of the Eaſt and Weſt Indies.

CARDISSON, a village in Norfolkſhire, near Rapeham.

CARDIUM, the COCKLE, in zoology, a genus of inſects belonging to the order of vermes teſtaceæ. The ſhell conſiſts of two equal valves, and the ſides are equal. There are 21 ſpecies of this genus. They are common on all ſand coaſts; lodged a little beneath the ſand; their place marked by a depreſſed ſpot; and are wholeſome and delicious food.

* CARDMAKER. *n. ſ.* [from *card* and *make*.] A maker of cards. Am not I Chriſtophero Sly, by occupation a *cardmaker*? *Shakeſp. Taming of the Shrew*.

* CARDMATCH *n. ſ.* [from *card* and *match*.] A match made by dipping pieces of card in melted ſulphur.—Take care, that thoſe may not make the moſt noiſe who have the leaſt to ſell; which is very obſerveable in the venders of *cardmatches*. *Addiſon*.

CARDOCK HILL, near Cardington, Salop.

CARDONA, a handſome town of Spain, in Catalonia, with a ſtrong caſtle. Near it is an inexhauſtible mountain of ſalt of ſeveral colours, red, white, carnation, and green. When waſhed, they all become white. There are alſo vineyards which produce excellent wine, and very lofty pine trees. It is ſeated on an eminence, near the Cardenero. Lon. 1. 26. E. Lat. 41. 42. N.

CARDROSS, a pariſh of Scotland, in Dumbartonſhire, ſeparated by the Frith of Clyde from Port Glaſgow and Greenock, and watered on the E. by the Leven. It is 7 miles long and 3 broad. The ſoil is partly light gravel, and partly clay; and produces oats, barley, potatoes, wheat, peaſe and beans. The climate is wet. The breed of horſes is much improved: and, to the honour of Sir Archibald Edmondſton and the other proprietors, the farm houſes are not only neat but even elegant. The natural wood is conſiderable, and brings, at a cutting, betwixt 2000l. and 3000l. There are alſo 200 acres planted with firs, larixes, &c. The roads are good. The population, in 1801, was 2549, and had increaſed no leſs than 1754 ſince 1755, owing to the printfields, &c. eſtabliſhed in the pariſh. The celebrated Dr SMOLLETT was born in it.

CARDUEL, a province of Aſia, in Georgia, lying between the Euxine and Caſpian ſeas, and divided between the Turks and Perſians. Teſflis is the capital.

CARDUNACK, a village in Cumberland, in the pariſh of Boulneſs.

(1.) CARDUUS, in botany, the THISTLE; a genus of the polygamia æqualis order; belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The calyx is ovate, imbricated with prickly ſcales, and the receptacle hairy. Of this genus there are 26 ſpecies, ten of which are natives of Britain, and being troubleſome weeds require no deſcription. Some of the exotics are propagated in gardens for the ſake of variety.

(2.) CARDUUS BENEDICTUS. See CNICUS.

* CARE. *n. ſ.* [*care*, Sax. 1. Solicitude; anxiety; perturbation of mind; concern.—

> Or, if I would take *care*, that *care* ſhould be,
> For wit that ſcorn'd the world, and liv'd like me. *Dryden*.
>
> Nor ſullen diſcontent, nor anxious *care*,
> Ev'n tho' brought thither, could inhabit there. *Dryden*.

2. Caution; often in the phraſe to *have a care*.—Well, ſweet Jack, *have a care* of thyſelf. *Shakeſp.*—The fooliſh virgins have taken no *care* for a further ſupply, after the oil, which was at firſt put into their lamps, was ſpent. *Tillotſon*.—

> Begone! the prieſt expects you at the altar.—
> But, tyrant, *have a care*, I come not thither. *A. Philips*.

3. Regard; charge; heed in order to protection and preſervation.—If we believe that there is a God, that takes *care* of us, and we be careful to pleaſe him, this cannot but be a mighty comfort to us. *Tillotſon*. 4. It is a looſe and vague word, implying attention or inclination, in any degree more or leſs: It is commonly uſed in the phraſe to *take care*.—We *take care* to flatter ourſelves with imaginary ſcenes and proſpects of future happineſs. *Atterbury*. 5. The object of care, of caution, or of love.—

> O my poor kingdom, ſick with civil blows!
> When that my *care* could not with-hold thy riots,
> What wilt thou do when riot is thy *care*? *Shakeſpeare*.
>
> Fluſh'd were his cheeks, and glowing were his eyes:
> Is ſhe thy *care*? is ſhe thy *care*? he cries. *Dryd*.

* *To* CARE. *v. n.* [from the noun.] 1. To be anxious or ſolicitous; to be in concern about any thing.—She *cared* not what pain ſhe put her body to, ſince the better part, her mind, was laid under ſo much agony. *Sidney*.—

> Well, on my terms thou wilt not be my heir;
> If thou *car'ſt* little, leſs ſhall be my *care*. *Dryd*.

2. To be inclin'd; to be diſpoſed; with *for* before nouns, or *to* before verbs.—The remarks are introduced by a compliment to the works of an author, who, I am ſure, would not *care for* being praiſed at the expence of another's reputation. *Addiſon*.—Great maſters in painting never *care for* drawing people in the faſhion. *Spectator*. 3. To be affected with; to have regard to; with *for*.—There was an ape that had twins; ſhe doated upon one of them, and did not much *care for* t'other. *L'Eſtrange*.—Where few are rich, few *care for* it; where many are ſo, many deſire it. *Temple*.

CAREBY, a village in Lincolnſhire, 8 miles N. of Stamford.

* CARECRAZED. *adj.* [from *care* and *craze*.] Broken with care and ſolicitude.—

> Theſe both put off, a poor petitioner,
> A *carecraz'd* mother of many children. *Shakeſp*.

CAREEN, *n. ſ.* See CAREENING.

(1.) * *To* CAREEN. *v. n.* [*cariner*, Fr. from *carina*, Lat.] A term in the ſea language. To lay a veſſel on one ſide, to caulk, to ſtop leaks, refit, or trim the other ſide. *Chambers.*

(2.) * *To* CAREEN. To be in the ſtate of careening.

CAREENING. See *To* CAREEN, N° 1. A ſhip is ſaid to be brought to the CAREEN, when, moſt of her lading being taken out, ſhe is hulled down on one ſide, by a ſmall veſſel, as low as neceſſary; and there kept by the weight of the ballaſt, ordnance, &c. as well as by ropes, leſt her maſts ſhould be ſtrained too much; in order that her ſides and bottom may be trimmed, ſeams caulked, or any thing that is faulty under water mended. Hence, when a ſhip lies on one ſide when ſhe ſails, ſhe is ſaid to ſail on the careen.

(1.) * CAREER. *n. ſ.* [*carriere*, Fr.] 1. The ground on which a race is run; the length of a courſe.—They had run themſelves too far out of breath, to go back again the ſame *career*. *Sidney.* 2. A courſe; a race.—

What rein can hold licentious wickedneſs,
When down the hill he holds his fierce *career*? *Shakeſpeare.*

3. Height of ſpeed; ſwift motion.—It is related of certain Indians, that they are able, when a horſe is running in his full *career*, to ſtand upright on his back. *Wilkins.*—

Practiſe them now to curb the turning ſteed,
Mocking the foe; now to his rapid ſpeed
To give the rein, and, in the full *career*,
To draw the certain ſword, or ſend the pointed ſpear. *Prior.*

4. Courſe of action; uninterrupted procedure.—Shall quips and ſentences, and theſe paper bullets of the brain, awe a man from the *career* of his humour? *Shakeſp.*—

Knights in knightly deeds ſhould perſevere,
And ſtill continue what at firſt they were;
Continue, and proceed in honour's fair *career*. *Dryden.*

(2.) CAREER, in falconry, is a flight or tour of the bird, about 120 yards. If ſhe mount more, it is called a *double career*; if leſs, a *ſemi-career*.

(3.) CAREER, in the ancient circus. See § 1. *def.* 1. and CIRCUS.

(4.) CAREER, in the menage, 1. a place incloſed with a barrier, wherein they run the ring: 2. the courſe of the horſe, provided it do not exceed 200 paces.

* *To* CAREER. *v. n.* [from the noun.] Running with ſwift motion.—

With eyes, the wheels
Of beryl, and *careering* fires between. *Milton.*

* CAREFUL. *adj.* [from *care* and *full*.] 1. Anxious; ſolicitous; full of concern.—Martha, thou art *careful*, and troubled about many things. *Luke* x. 41.—

Welcome, thou pleaſing ſlumber;
A while embrace me in thy leaden arms,
And charm my *careful* thoughts. *Denh. Sophy.*

2. Provident; diligent: with *of* or *for*.—Behold, thou haſt been *careful for* us with all this care; what is to be done for thee? 2 *Kings*.—

To cure their mad ambition, they were ſent
To rule a diſtant province, each alone:
What could a *careful* father more have done? *Dryden.*

3. Watchful; cautious: with *of*.—It concerns us to be *careful of* our converſations. *Ray.* 4. Subject to perturbations; expoſed to troubles; full of anxiety; full of ſolicitude.—

By him that rais'd me to this *careful* height,
From that contented hap, which I enjoy'd. *Shak.*

* CAREFULLY. *adv.* [from *careful*.] 1. In a manner that ſhews care.—Envy, how *carefully* does it look? how meagre and ill complexioned? *Collier.* 2. Heedfully; watchfully; vigilantly; attentively.—You come moſt *carefully* upon your hour. *Shakeſp.*—By conſidering him ſo *carefully* as I did before my attempt, I have made ſome faint reſemblance of him. *Dryden.* 3. Providently. 4. Cautiouſly.

* CAREFULNESS. *n. ſ.* [from *careful*.] Vigilance; heedfulneſs; caution.—The death of Selymus was, with all *carefulneſs*, concealed by Ferhates. *Knolles's Hiſtory of the Turks.*

CAREHOUSE, a village in Northumberland, between Hexham and Billingham.

* CARELESLY. *adv.* [from *careleſs*.] Negligently; inattentively; without care; heedleſly.—

There he him found all *careleſly* diſplay'd,
In ſecret ſhadow from the ſunny ray. *Fairy Q.*

* CARELESSNESS. *n. ſ.* [from *careleſs*.] Heedleſneſs; inattention; negligence; abſence of care; manner void of care.—For Coriolanus, neither to care whether they love or hate him, manifeſts the true knowledge he has of their diſpoſition, and out of his noble *careleſneſs*, lets them plainly ſee it. *Shak. Coriolanus.*—

Who, in the other extreme, only doth
Call a rough *careleſneſs* good faſhion;
Whoſe cloak his ſpurs tear, or whom he ſpits on,
He cares not. *Donne.*

I who at ſome times ſpend, at others ſpare,
Divided between *careleſneſs* and care. *Pope.*

* CARELESS. *adj.* [from *care*.] 1. Without care; without ſolicitude; unconcerned; negligent; inattentive; heedleſs; regardleſs; thoughtleſs; neglectful; unheeding; unthinking; unmindful: with *of* or *about*.—Knowing that if the worſt befal them, they ſhall loſe nothing but themſelves; *whereof* they ſeem very *careleſs*. *Spenſer.*—A woman the more curious ſhe is about her face, is commonly the more *careleſs about* her houſe. *Ben Jonſon.*—A father, unnaturally *careleſs of* his child, ſells or gives him to another man. *Locke.* 2. Cheerful; undiſturbed.—

In my cheerful morn of life,
When nurs'd by *careleſs* ſolitude I liv'd,
And ſung of nature with unceaſing joy,
Pleas'd have I wander'd thro' your rough domain. *Thomſon.*

3. Unheeded; thoughtleſs; unconſidered.—The freedom of ſaying as many *careleſs* things as other people, without being ſo ſeverely remarked upon. *Pope.* 4. Unmoved by; unconcerned at.—

Careleſs of thunder from the clouds that break,
My only omens from your looks I take. *Granv.*

CARELIA, the eaſtern province of Finland, extending from Savolaxia, on the N. to the gulf on the S. By a late treaty it was ceded to Ruſſia; but was formerly divided into

1. Carelia, Muscovite, of which the capital was Provenza; and,

2. Carelia, Swediſh; capital Weiburg.

CARELSCROON. See Carlscrona.

CARENTAN, a town of France, in the department of the Channel, and ci-devant province of Normandy, with an ancient caſtle. It is 8 miles from the ſea, and 95 W. of Rouen. Lon. 1. 4. W. Lat. 49. 16. N.

CARES. See Carians.

CARESBROOKE Castle. See Carisbrook.

CARESEN, or Cassen, a ſea port of Arabia Felix, on the Indian Ocean, 300 miles NE. of Aden. Lon. 52. 7. E. Lat. 16. 5. N.

CARESLEY, a town N. of Coventry, Warwickſhire.

* CARESS. *n. ſ.* [from the verb.] An act of endearment; an expreſſion of tenderneſs.—

He, ſhe knew, would intermix
Grateful digreſſions, and ſolve high diſpute
With conjugal *careſſes*. *Milton.*

—There are ſome men who ſeem to have brutal minds wrapt up in human ſhapes; their very *careſſes* are rude and importune. *L'Eſtrange.*

* *To* Caress. *v. a.* [*careſſer*, Fr. from *carus*, Lat.] To endear; to fondle; to treat with kindneſs.—If I can feaſt, and pleaſe, and *careſs* my mind with the pleaſures of worthy ſpeculations, or virtuous practices, let greatneſs and malice vex and abridge me, if they can. *South.*

CARESTON, or Caraldston, a pariſh of Scotland, in Angus-ſhire, ſaid to have derived its name from *Carril*, one of Oſſian's heroes. It is 5 miles long and 1 broad; is ſituated 9 miles from Forfar, 4 from Brechin, and 12 from Montroſe; and is the property of George Skene, Eſq. of Skene, who has an ancient famliy ſeat in it. The ſoil is fertile and the climate healthy. Of 1500 acres 200 are planted with wood, 350 under corn, flax, &c. and the reſt moſtly under clover and rye graſs. The tenants have their leaſes on reaſonable terms, and are in comfortable circumſtances. The population in 1801, was 229, and had decreaſed 40 ſince 1755.

CARSEWELL, a town W. of Cheadle, in Staffordſhire.

(1.) * CARET. *n. ſ.* [*caret*, Lat.] There is wanting.] A note which ſhews where ſomething interlined ſhould be read.

(2.) Caret, in writing, is marked thus ^.

CARETTI, in botany, a name by which many authors have called the acacia gloriosa, or the tree which produces the marſao, or bezoar nuts. See Acacia, N° 2.

(1.) CAREW, George, an eminent commander in Ireland, born in Devonſhire, in 1557. He was made preſident of Munſter by queen Elizabeth; when, joining his forces with the earl of Thomond, he reduced the Iriſh inſurgents, and brought the earl of Deſmond to his trial. K. James I. made him governor of Guernſey, and created him baron. As he was a valiant commander, he was no leſs a polite ſcholar; and wrote *Pacata Hibernia*, a hiſtory of the late wars in Ireland, printed after his death, in 1633. He made ſeveral collections for a hiſtory of Henry V. which are digeſted into Speed's Hiſtory of Great Britain. Beſides theſe, he collected materials of Iriſh hiſtory, in 4 large MSS. vols. now in the Bodleian library, Oxford.

(2.) Carew, Richard, the eldeſt ſon of Thomas Carew, of Eaſt Anthony, and author of the *Survey of Cornwall*, was born in 1555. When very young he became a commoner of Chriſt church college, Oxford; and at 14 years of age had the honour of diſputing, extempore, with the afterwards famous Sir Philip Sidney, in the preſence of the earls of Leiceſter, Warwick and other nobility. After ſpending three years at the univerſity, he ſpent other three at the Middle Temple, and then travelled. Not long after his return to England, he married, in 1577, Juliana Arundel, of Trerice. In 1581, he was made juſtice of the peace, and, in 1586, high ſheriff of Cornwall. In 1589, he was elected a member of the college of Antiquaries. His Survey of Cornwall was publiſhed, in 4to, at London, in 1602; and has been twice reprinted in 1723, and 1769. Of this work Cambden has ſpoken in high terms. He tranſlated a work from the Italian, intituled, "The Examination of Men's Wits: In which, by diſcovering the variety of natures, is ſhowed for what profeſſion each one is apt, and how far he ſhall profit therein." This was publiſhed at London, 1594, and 1604; but has been principally aſcribed by ſome to his father. Carew wrote alſo, "The true and ready Way to learn the Latin Tongue." He was a gentleman of abilities and literature, and was held in great eſteem by the moſt eminent ſcholars of his time; particularly Sir Henry Spelman.

(3.) Carew, Sir George, younger brother of Richard, (N° 2.) was educated at Oxford, ſtudied the law in the inns of court, and then travelled for farther improvement. On his return, he was called to the bar, and after ſome time appointed ſecretary to Sir Chriſtopher Hatton, lord chancellor, by the ſpecial recommendation of Queen Elizabeth; who gave him a prothonotaryſhip in the chancery, and conferred on him the honour of knighthood. In 1597, he was ſent ambaſſador to the K. of Poland. Under K. James I. he was one of the commiſſioners for treating with the Scots concerning an union between the two kingdoms; after which he was appointed ambaſſador to France, where he continued from the end of 1605 till 1609. He there formed an intimacy with Thuanus, to whom he communicated an account of the tranſactions in Poland, whilſt he was employed there, which was of great ſervice to that admirable author in drawing up the 21ſt book of his hiſtory. After Sir George's return from France, he was appointed maſter of the court of Wards, which he did not long live to enjoy; for it appears by a letter from Thuanus to Cambden, in 1613, that he was then lately deceaſed. Sir George married Thomaſine, daughter of Sir Francis Godolphin, great-grandfather of the lord treaſurer Godolphin, and had by her two ſons and three daughters. When Sir George returned from his French embaſſy, he drew up, and addreſſed to James I. "A Relation of the State of France, with the characters of Henry IV. and the principal Perſons of that Court." The characters are drawn from perſonal knowledge and Cloſe obſervation, and might be of ſervice to a hiſtorian. The compoſition is perſpicuous and manly, and entirely free from the pedantry which prevailed in the reign of James I. This valuable tract lay long in MS. till falling into the hands of the earl of Hardwicke, he communicated it to Dr Birch, who publiſhed it, in 1749, at the end of his "Hiſtorical View of the Negociations between the Courts of England, France and Bruſſels, from 1592 to 1617." That intelligent writer juſtly obſerves, that it is a model upon which ambaſſadors may form their repreſentations.

(4.) CAREW, Thomas, deſcended from the family of Carew, in Glouceſterſhire, was gentleman of the privy chamber to Charles I. who always eſteemed him one of the moſt celebrated wits of his court. He was much reſpected by the poets, particularly Ben Jonſon and Sir William Davenant; and left behind him ſeveral poems and a maſque called *Cælum Britannicum* performed at Whitehall on Shrove Tueſday night, 1633, by the king, and ſeveral of his nobles with their ſons. Carew was aſſiſted in the contrivance by Inigo Jones, and the muſic was ſet by Mr Henry Lawes of the king's chapel. He died in the prime of life, about 1639.

(1.) CAREX, an iſland in the Perſian Gulf.

(2.) CAREX, in botany, a genus of plants, of the monœcia order, in the triandria claſs of plants; and in the natural method ranking under the 3d order, *Calamariæ*. The characters are theſe: it produces male and female flowers, in moſt ſpecies, on the ſame plants; the male flowers are digeſted into a long ſpike: the calyx is an oblong and imbricated omentum, conſiſting of acute, hollow, and lanceolated ſcales, each containing one flower; there is no corolla; the ſtamina are three erect cetaceous filaments of the length of the calyx; the antheræ are oblong, and erect. In the female flowers the calyx is the ſame as in the male; there are no petals, but there is an inflated oblong nectarium; the germen is triangular, and is placed within the nectarium; the ſtyle is very ſhort; the ſtigmata are 2, or 3; long, crooked, pointed, and hoary. The nectarium grows larger when the flower is fallen, and contains the ſeed; which is ſingle, of an acute ovate form, triangular, and has one of its angles uſually much ſmaller than the others. There are 38 ſpecies.

CAREY, Harry, a man diſtinguiſhed by poetry and muſic, but more by a certain facetiouſneſs, which made him agreeable to every body. He publiſhed, in 1720, a little collection of poems; and in 1732, ſix cantatas compoſed by himſelf. He alſo compoſed ſundry ſongs for modern comedies, particularly thoſe in the Provoked Huſband. He wrote a farce called *The Contrivances*, in which were ſeveral little ſongs to very pretty airs of his own compoſition: he alſo made ſeveral little dramas for Goodman's-fields theatre, which were favourably received. In 1729, he publiſhed by ſubſcription his poems much enlarged: with the addition of one intituled *Namby Pamby*, in which Ambroſe Philips is ridiculed. Carey's talent, ſays his hiſtorian, lay in humour and unmalevolent ſatire: To ridicule the rant and bombaſt of modern tragedies he wrote one, to which he gave the ſtrange title of *Chrononhotonthologos*, which is a maſter-piece in that ſpecies of ſatire. It was acted in 1734. He alſo wrote a farce called *The Honeſt Yorkſhireman*. Carey had an unſurmountable averſion to the Italian opera and the ſingers in it; he wrote a burleſque opera on the ſubject of the *Dragon of Wantley*; and afterwards a ſequel to it, intituled, *The Dragoneſs*; both true burleſques upon the Italian opera. His qualities being of the entertaining kind, he was led into more expences than his finances could bear, and thus was frequently in diſtreſs. His friends however were always ready to aſſiſt him by their ſubſcriptions to his works; and encouraged by theſe, he republiſhed, in 1740, all the ſongs he had ever compoſed, in a collection, intituled, "The Muſical Century, in 100 Engliſh Ballads," &c. and in 1743, his dramatic works, in a ſmall volume, 4to. With all his good humour, he ſeems to have been at times deeply affected with the malevolence of ſome of his own profeſſion, who, doubtleſs from envy, were his enemies; and this, with the preſſure of his circumſtances, is ſuppoſed to have occaſioned his untimely end; for about 1744, at his houſe in Warner ſtreet, he put a period to his life, which, ſays Sir John Hawkins, had been led without reproach. It is the more to his praiſe that it is ſingular in ſuch a character, that in all his ſongs and poems on wine, love, &c. he manifeſted an inviolable regard for decency and good manners.

CAREY-LITES, a village in Somerſetſhire, E. of Somerton.

CAREY'S FORT, 7 miles SW. of Wicklow, in Ireland.

CARGADORS, a name which the Dutch give to thoſe brokers, whoſe buſineſs is to find freight for ſhips outward bound, and to give notice to the merchants, who have commodities to ſend by ſea, of the ſhips that are ready to ſail, and of the places for which they are bound.

CARGAPOL. See KARGAPOL.

* CARGASON. *n. ſ.* [*cargacon*, Spaniſh.] A cargo. Not uſed.—My body is a *cargaſon* of ill humours. *Howel's Letters*.

CARGERON, a village in Cornwall, 2 miles NE. of Saltaſh.

(1.) CARGILL, [from *caer*, a village, and *cill*, a place of worſhip,] a pariſh of Scotland, in Perthſhire, about 6 miles long from W. to E. and 4 broad. It lies in Strathmore, 9 miles from Perth and 4 from Cupar of Angus, and is watered by the Tay on the N. The air is extremely pure, and contributes much to the health and longevity of the natives. Agriculture is much improved; and except the woodlands it is moſtly arable. The ſoil on the banks of the river, is a deep rich clay; farther back, it is loamy; and at the foot of the hills it becomes gravelly and unproductive. The population, in 1801 was 1585, and had decreaſed 332 ſince 1755.

(2.) CARGILL, a village in the pariſh, N° 1.

CARGILLEN, a village in Cornwall, between Dulo and Morvale.

CARGILLITES, a denomination given to a religious ſect in Scotland, more generally known by that of *Cameronians*. To the brief account of this ſect, already given under the latter denomination, (ſee CAMERONIANS, N° 1.) we add the following candid hiſtorical ſketch of their origin and leading

ing principles, by a clergyman of the eſtabliſhed church. The rev. Dr Samuel Charteris, in his firſt *Diſcourſe on the Revolution*, preached at Wilton on the centenary anniverſary of that great event, Nov. 5, 1788, after giving a brief view of the dreadful perſecution of the preſbyterians under Charles II. and enumerating ſeveral inſtances of peculiar barbarity exerciſed upon them, ſays, "The principle of ſelf-defence again was rouſed. *The powers that were* had not only withdrawn protection, but in effect levied war againſt conſcientious worſhippers. Their meeting for worſhip in the fields was conſtrued treaſon. Death was denounced againſt the preacher, and a price was ſet upon his head. It was matter of ſport to the inſolent and ſavage ſoldiery, to ſearch them out, and to hunt them down. They at laſt aſſembled for worſhip with arms in their hands, to repel thoſe inſolent and rude attacks, to defend their own religious liberty, and to protect thoſe miniſters, who put their lives in their hands, to ſerve them in the miniſtry of the goſpel. Their reſiſtance over-awed the ſoldiers, and afforded a temporary protection to their worſhipping aſſemblies. For defence and ſecurity in ſocial worſhip, they kept much together. Their increaſing numbers alarmed government. The D. of Buccleugh was ſent from England with a military force, and at Bothwell Bridge he ſubdued and diſperſed them." (See BOTHWELL BRIDGE.) —"Though this reſiſtance was ill conducted and eaſily ſubdued, yet it afforded another proof, that the national ſpirit was not extinguiſhed; and farther paved the way for the triumph of liberty in the ſucceeding reign. Unſucceſsful reſiſtance increaſes the power of a tyrant, and inflames his wrath; and he makes the yoke, which they attempted to break, gall the more." Of this Dr Charteris gives many inſtances, from which we ſhall only ſelect one.—"In Scotland the proceedings are marked with a ſtill deeper ſtain of ignominy. There we find the council of ſtate and the judges of the land putting ſervant girls to death for political opinions. Iſobel Aliſon and Marion Harvey, young women in the humbleſt ſphere of life, who had done nothing worthy of death or of bonds, were condemned to be hanged for their candid anſwers to enſnaring queſtions. They died, leaving their blood on the D. of York, and the counſellors and judges; nor could theſe men have deviſed a method more effectual to diſgrace the page of hiſtory, and to leave an indelible blot on their adminiſtration and their names.—The mind ſtrengthens in adverſity, and courage riſes from deſpair. In the midſt of the fiery furnace of perſecution, men appeared, aſſuming the high character of witneſſes for God, and maintaining it in the face of danger and death. Though few in number, they lifted up the fallen ſtandard of religious liberty, and generouſly devoted themſelves. They would ſwear no oaths, ſubſcribe no bonds, take no teſt, nor yield to any impoſition on conſcience. Theſe they accounted *ſnares and nets to catch men, and caſt them down from their excellency*: for what is the excellency of a man but uprightneſs?—They would not pray for the king, becauſe that might be conſtructed as owning a title, which in their judgment, he had forfeited; and they reſolved, whatever it might coſt, to be ingenuous and open, deciſive and unembarraſſed, both in word and in deed. They teſtified againſt all the arbitrary perſecuting acts of Charles; and publiſhed acts of their own, diſowning the king, excluding the D. of York, and declaring war in defence of their religion and lives. The avowal of diſaffection was the ſignal of death; and by means of mercenary ſpies and traitors, many of them were ſeized and executed. Their bold example attracted congenial ſpirits, and like the Iſraelites in Egypt, the more they were afflicted, the more they grew and multiplied. They formed into ſocieties and ſettled the ground and nature of their teſtimony. A love of liberty they conſidered as their national character, which it was their duty to maintain and tranſmit. A defenſive war againſt tyranny they juſtified by the law of nature, and by precepts and doctrines in the bible. (Prov. xxiv. 11.) Our brethren "are drawn unto death," and we "are ready to be ſlain:" in ſuch circumſtances to forbear is to partake the ſin of murderers.—The powers that be are of God, but he ordains them to be miniſters to men *for good*. Even the covenant, by which the poſterity of David were to ſit on their fathers throne, was ſuſpended on conditions. (2 Chron. vi. 16.) Such were in part the principles of thoſe whom Wodrow calls *Society People*,—and who, from the names of two of their leaders, were likewiſe called CAMERONIANS and CARGILLITES. If in ſome inſtances they run to extremes, Solomon's ſaying will be remembered, *Surely oppreſſion maketh a wiſe man mad.* Their imprudence was cenſured in oppoſing a tyrant, without any probable means of ſucceſs: their intolerance was cenſured in excluding from their ſociety ſuch as came not up to all their notions, but who would willingly have joined them to throw off the tyrants yoke: While they reprobated the teſts, which were then impoſed, they themſelves continued to impoſe the ſolemn league and covenant. Notwithſtanding their errors, the cauſe of liberty was indebted to their bizarre exertions. Their ſtandard on the mountains of Scotland indicated to the vigilant eye of William, that the nation was ripening for a change. They expreſſed what others thought, uttering the indignation and the groans of a ſpirited and oppreſſed people. They inveſtigated and taught under the guidance of feeling, the reciprocal obligations of kings and ſubjects; the duty of ſelf-defence, and of reſiſting tyrants; the generous principle of aſſiſting the oppreſſed, which, in their language, was *helping the Lord againſt the mighty*. Theſe ſubjects, which have ſince been inveſtigated by philoſophers in the cloſet, and adorned with eloquence in the ſenate, were then illuſtrated by men of feeling in the field. While Lord Ruſſel and Sidney, and other enlightened patriots in England, were plotting againſt Charles, from a conviction that his right was forfeited; the Cameronians in Scotland, under the ſame conviction, had the courage to declare war againſt him. Both the plotters and the warriors fell; but their blood watered the plant of renown and ſucceeding ages have eaten the pleaſant fruit." —We need only add, that the ſucceſſors of theſe heroes ſtill adhere to the ſolemn league and covenant, and to the leading principles above mentioned by Dr Charteris.

* **CARGO.** *n. ſ.* [*charge*, Fr] The lading of a ſhip; the merchandize or wares contained and conveyed in a ſhip.—In the hurry of the ſhipwreck Simonides was the only man that appeared unconcerned, notwithſtanding that his whole fortune was at ſtake in the *cargo*.

CARHAIZ, a town of France in the department of Finiſterre, 19 miles S. of Morlaix.

CARHAMPTON, a town in Somerſetſhire, near Dunſter.

CARHAM, a village of England, in Northumberland, 5 miles E. of Kelſo. Near it a battle was fought between the Engliſh and Danes, in which 11 biſhops, and 2 Engliſh counts were ſlain beſides a great number of ſoldiers. Here likewiſe was a battle between the Engliſh and Scots, in 1018, in which the latter were victorious. In 1370 Sir John Liſburne was defeated near this place, and taken priſoner by the Scots.

CARIA, in ancient geography, a country of Aſia; whoſe limits are extended by ſome, and contracted by others. Mela and Pliny extend the maritime Caria from Jaſus and Halicarnaſſus, to Calynda, and the borders of Lycia. Ptolemy extends the inland Caria to the Meander and beyond.

CARIACOU, the chief of the Grenadine iſles. It contains 1613 acres of fertile land, which produces about 10,000lb. of cotton, beſides ſugar, corn, potatoes, &c.

CARIANS, } or CARIATIDES, the inhabitants
CARIATES, } of Caria; called alſo CARES, CARINSÆ, CARIDES, and *Cairæ*.—The Carians being the Swiſs of thoſe days, were hired and placed in the front of the battle. *Cum Care Cariſſa*, denoted the behaviour of clowns. The Carians are ſaid to have come originally from the iſlands to the continent, and to have been formerly ſubject to Minos, and called LELEGES. They are of a common original with the Myſi and Lydi, having a common temple, of a very ancient ſtanding, at Melaſſa, a town of Caria, called *Jovis Carii Delubrum*. Homer calls them barbarians in language.

CARIATI, a town of Naples in Calabria, with a biſhop's ſee. It is two miles from the gulf of Taranto, and 37 NE. of Coſenza. Lon. 17. 10. E. Lat. 30 38. N.

CARIATIDES. See CARIANS, and CARYATIDES.

CARRIBBEE ISLANDS, a cluſter of iſlands ſituated in the Atlantic ocean between 59° and 63° Lon. W. and between 11° and 18° Lat. S. They lie in the form of a bow or ſemicircle, ſtretching almoſt from the coaſt of Florida N. to near the river Oronoque. Thoſe that lie neareſt the E. have been called the WINDWARD ISLANDS; the others the *Leeward*, on account of the winds blowing generally from the eaſtern point in thoſe quarters. Abbe Raynal conjectures them to be the tops of very high mountains formerly belonging to the continent, which have been changed into iſlands by ſome revolution that has laid the flat country under water. The direction of the Carribbee iſlands, beginning from Tobago, is nearly N. and NNW. This direction is continued forming a line ſomewhat curved towards the N. W. and ending at Antigua. In this place the line becomes at once curved; and extending in a ſtraight direction to the W. and NW. meets with Porto-Rico, St Domingo, and Cuba, known by the name of the *Leeward Iſlands*, which are ſeparated from each other by channels of various breadths. Some of theſe are 6, others 15 or 20 leagues broad; but in all of them the ſoundings are from 100 to 120 or 150 fathoms. Between Grenada and St Vincent's there is alſo a ſmall archipelago of 31 leagues, in which the ſoundings are not above 10 fathoms. The mountains in the Caribbee iſlands run in the ſame direction as the iſlands themſelves. The direction is ſo regular, that if we were to conſider the tops of theſe mountains only, independent of their baſis, they might be looked upon as a chain of hills belonging to the continent, of which Martinico would be the moſt northweſterly promontory. The ſprings of water which flow from the mountains in the Windward Iſlands, run all in the weſtern parts of theſe iſlands. The whole eaſtern coaſt is without any running water. No ſprings come down there from the mountains: and indeed they would have there been uſeleſs; for after having run over a very ſhort tract of land, and with great rapidity, they would have fallen into the ſea. In Porto Rico, St Domingo, and Cuba, there are a few rivers that diſcharge themſelves on the northern ſide, and whoſe ſources riſe in the mountains running from E. to W. that is, through the whole length of theſe iſlands. From the other ſide of the mountains facing the S. where the ſea flowing with inundations, ſeveral rivers run down, the mouths of which are capable of receiving the largeſt ſhips. The ſoil of the Carribbees conſiſts moſtly of a layer of clay or gravel of different thickneſs; under which is a bed of ſtone or rock. In thoſe places where the clay is drier and more friable, and mixes with the leaves and remains of plants, a layer, of earth is formed of greater depth than where the clay is moiſter. The ſand or gravel has different properties according to its peculiar nature; wherever it is leſs hard, leſs compact, and leſs porous, ſmall pieces ſeparate themſelves from it, which, though dry, preſerve a certain degree of coolneſs uſeful to vegetation. This ſoil is called in America a *pumice-ſtone* ſoil. Wherever the clay akd gravel do not go through ſuch modifications, the ſoil becomes barren, as ſoon as the layer formed by the decompoſition of the original plants is deſtroyed.—As the Carribbee iſlands are all between the tropics, their inhabitants are expoſed, allowing for the varieties reſulting from difference of ſituation and ſoil, to a perpetual heat, which generally increaſes from ſun-riſing till one after noon, and then declines in proportion as the ſun declines. The variations of the temperature of the air ſeem to depend rather on the wind than on the changes of the ſeaſons. In thoſe places where the wind does not blow, the air is exceſſively hot, and none but the eaſterly winds contribute to temper and refreſh it: thoſe that blow from the S. and W. afford little relief: but they are much leſs frequent and leſs regular than that which blows from the E. The branches of the trees expoſed to the influence of the latter are forced round towards the W.: but their roots are ſtronger, and more extended under the ground, towards the E. than towards the W. and hence they are eaſily thrown down by ſtrong W. winds or hurricanes from that quarter. The E. wind is ſcarce felt in the Carribbee iſlands before 9 or 10 o'clock in the morning: increaſes in proportion as the ſun riſes above the horizon, and decreaſes as it declines. Towards evening it ceaſes entirely to blow on the coaſts, but not on the open ſea. It blows with more force, and more regularity. in the dog-days than at any other time of the year. The rain alſo contributes to the temperature of the Caribbee iſlands, though not equally in them all. In thoſe places where the eaſterly wind meets with nothing to oppoſe its progreſs, it diſpels the clouds as they begin to riſe, and cauſes them to break either in the woods or upon the mountains. But when the ſtorms are too violent or the E. wind is interrupted by the changeable and temporary effects of the S. and W. ones, it begins to rain. In the other Carribbee iſlands, where this wind does not generally blow, the rains are ſo frequent and plentiful, eſpecially in the winter ſeaſon, which laſts from the middle of July to the middle of October, that, according to the moſt accurate obſervations, as much rain falls in one week as in our climates in a year. Inſtead of thoſe mild refreſhing ſhowers which fall in the European climates, the rains of the Caribbee iſlands are torrents, the ſound of which might be miſtaken for hail were not that almoſt totally unknown under ſo burning a ſky. Theſe ſhowers indeed refreſh the air; but they occaſion a dampneſs, the effects of which are not leſs diſagreeable than fatal. The dead muſt be interred within a few hours after they have expired. Meat will not keep ſweet above 24 hours. The fruits decay, whether they are gathered ripe or before their maturity. The bread muſt be made up into biſcuits to prevent its growing mouldy. Common wines turn ſour, and iron turns ruſty, in a day. The ſeeds can only be preſerved by conſtant attention and care, till the proper ſeaſon returns for ſowing them. When the Carribbee iſlands were firſt diſcovered, the corn that was conveyed there for the ſupport of the Europeans, was ſo ſoon damaged, that it became neceſſary to ſend it out in the ears. This neceſſary precaution ſo much enhanced the price of it, that few were able to purchaſe it. Flour was then ſubſtituted in lieu of corn; which lowered indeed the expences of tranſport, but had this inconvenience, that it was ſooner damaged. It was imagined by a merchant, that if the flour were entirely ſeparated from the bran, it would have the double advantage of being cheaper and keeping longer. He cauſed it therefore to be ſifted, and put the fineſt flour into ſtrong caſks, and beat it cloſe together with iron hammers, till it became ſo cloſe a body that the air could ſcarcely penetrate it. This method was found to anſwer the purpoſe; and thus, though the flour cannot be preſerved as long as in our dry and temperate climates, it may be kept for ſix months, a year or longer, according to the degree of care taken in the preparation. However troubleſome theſe effects of the rain may be, it is attended with ſome others ſtill more formidable; namely, frequent and dreadful earthquakes. Theſe happening generally during the time or towards the end of the rainy ſeaſon, and when the tides are higheſt, ſome naturaliſts ſuppoſe that there may be a connection between them. The waters of the ſky and of the ſea undermine, dig up, and ravage the earth in ſeveral different ways. Among the various ſhocks to which the Caribbee iſlands are expoſed from the fury of the boiſterous ocean, there is one diſtinguiſhed by the name of *raz de maree*, or *whirlpool*. It conſtantly happens once, twice, or thrice from July to October, and always on the weſtern coaſts, becauſe it takes place after the time of the weſterly or ſoutherly winds, or while they blow. The waves, which at a diſtance ſeem to advance gently within 400 or 500 yards, ſuddenly ſwell againſt the ſhore, as if acted upon in an oblique direction by ſome ſuperior force, and break with the greateſt impetuoſity. The ſhips which are then upon the coaſt, or in the roads beyond it, unable either to keep their anchors or to put out to ſea, are daſhed to pieces againſt the land, and all on board moſt commonly periſh. The hurricane is another terrible phenomenon in theſe iſlands, by which incredible damage is occaſioned; but happily it occurs not often. The produce of the Caribbee iſlands conſiſts of ſugar, rum, molaſſes, indigo, &c. a particular account of which will be found under the names of the reſpective iſlands. Theſe are generally reckoned 28 in number and include Antigua, Barbadoes, Cuba, Jamaica, &c. But Mr Walker ſays "the name *Caribbees* ſhould properly be confined to the ſmaller iſlands, which lie between Porto Rico and Tobago."

CARIBBEES, or **CARIBS**, the original inhabitants of the Caribbee iſlands, now almoſt extirpated, except in thoſe not poſſeſſed by the Europeans. By a treaty concluded in Jan. 1660, between the French and Engliſh, the Caribs were confined to the iſlands of St Vincent's and Dominica, where all the ſcattered body of this people were united, and at that time did not exceed in number 6000 men. See St VINCENT's and DOMINICA. Mr Walker ſays, "the ſmaller iſlands, between Porto Rico and Tobago, were inhabited by a hardy race of men, no-wiſe reſembling their feeble and timid neighbours in the larger iſlands."

CARIBBIANA, or **CARIBIANA**, the N. E. coaſt of Terra Firma, in S. America, otherwiſe called NEW ANDALUSIA.

(1.) **CARIBOU**, an iſland of North America, in Lake Superior.

(2.) **CARIBOU**, a ſpecies of ſtag. See CERVUS.

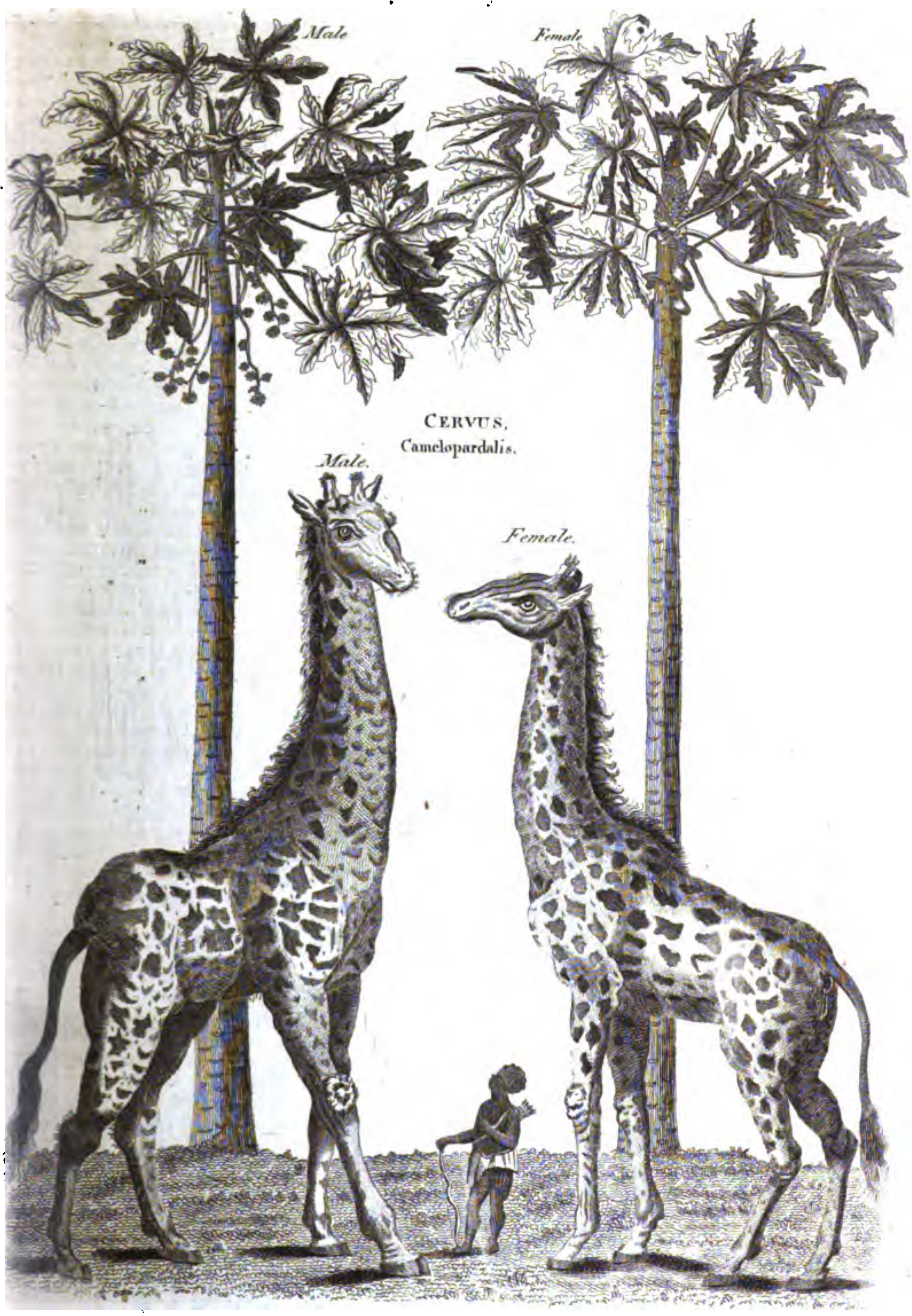
CARIBS. See CARIBBEES.

CARICA, the PAPAW; A genus of the decandria order, belonging to the diœcia claſs of plants, and in the natural method ranking under the 38th order, Tricoccæ. The calyx of the male almoſt none; the corolla is quinquefid and funnel-ſhaped; the filaments in the tube of the corolla, a longer and ſhorter one alternately. The calyx of the female quinquedentated; the corolla is pentapetalous, with 5 ſtigmata; the fruit an unilocular and polyſpermous berry. See *Plate* LV.

1. CAPRICA PAPAYA riſes with a thick, ſoft herbaceous ſtem, to the height of 18 or 20 feet, naked till within 2 or 3 feet of the top. The leaves come out on every ſide, upon very long footſtalks. Theſe undermoſt are almoſt horizontal, but thoſe on the top are erect; in full grown plants they are

CARICA,
Papaw Tree.

Plate LV.



Engraved for Encyclopædia Perthensis.

are very large, and divided into many lobes deeply ſinuated. The ſtem of the plant, and the footſtalks of the leaves, are hollow. The flowers of the male plant are produced from between the leaves on the upper part of the plant. They have footſtalks near two feet long; at the end of which the flowers ſtand in looſe cluſters, each having a ſeparate ſhort footſtalk: theſe are of a pure white, and have an agreeable odour. The flowers of the female papaya alſo come out from between the leaves towards the upper part of the plant, upon very ſhort foot ſtalks, cloſe to the ſtem: they are large, bell-ſhaped, compoſed of ſix petals, and commonly yellow; when theſe fall away, the germen ſwells to a large fleſhy fruit, of the ſize of a ſmall melon. Theſe fruits are of different forms: ſome angular and compreſſed at both ends; others oval, or globular: and ſome pyramidal. The fruit, and all the other parts of the tree abound with a milky acrid juice, which is applied for killing of ring worms. When the roundiſh fruit are nearly ripe, the inhabitants of India boil and eat them with their meat as we do turnips. They have ſomewhat the flavour of a pompion. Previous to boiling they ſoak them for ſome time in ſalt and water, to extract the corroſive juice; unleſs the meat they are to be boiled with ſhould be very ſalt and old, and then this juice makes it as tender as a chicken. But they moſtly pickle the long fruit, and thus they make no bad ſuccedanum for mango. The buds of the female flowers are gathered, and made into a ſweet-meat; and the inhabitants are ſuch good mangers of the produce of the tree, that they boil the ſhells of the ripe fruit into a repaſt, and the inſides are eaten with ſugar and pepper, like melons. The ſtem being hollow, has given birth to a proverb in the Weſt India iſlands; where, in ſpeaking of a diſſembling perſon, they ſay he is as hollow as a *Papaw*. The fruits are at beſt inferior to melons, but thoſe which have ripened in Britain were deſtable; the only uſe to which Mr Miller has known them put was, when about half grown, to ſoak them in ſalt water to get out the acrid juice, and then pickle them for onangos, for which they are a good ſubſtitute.

2. CARICA PROSOPOSA differs from the other in having a branching ſtalk, the lobes of the other ſhaped like a pear, and of a ſweeter flavour than the papaya. Both ſpecies being natives of hot countries, they cannot be preſerved in Britain unleſs conſtantly kept in a warm ſtove. They are eaſily propagated by ſeeds, which are annually brought in plenty from the Weſt Indies, though the ſeeds of the European plants ripen well. The ſeeds ſhould be ſown in a hot-bed early in ſpring; when the plants are near two inches high, they ſhould be removed into ſeparate ſmall pots, and each plunged into a hotbed of tanners bark, carefully ſhading them from the ſun till they have taken root: after which, they are to be treated in the ſame manner as other tender exotics. When removed into other pots, care muſt be taken to preſerve the ball of earth about them; for when their roots are laid bare they ſeldom ſurvive. When grown to a large ſize, they make a noble appearance with their ſtrong upright ſtems, garniſhed on every ſide near the top with large ſhining leaves, ſpreading out near three feet all round the ſtem: the flowers of the male ſort coming out in cluſters on every ſide, and the fruit of the female growing round the ſtalks between the leaves, are ſo different from any thing of European production, as well to entitle theſe plants to a place in the gardens of the curious.

CARICATURA, [from *carica*, a burden, Ital.] in painting, denotes the concealment of real beauties, and the exaggeration of blemiſhes, but ſtill ſo as to preſerve a reſemblance of the object.

CARICOL, a French ſettlement in the E. Indies on the W. coaſt of Coromandel, 70 miles S. of Pondicherry. Lon. 80. 12. Lat. E. 11. 15. N.

* CARICOUS TUMOUR. [from *carica*, a fig, Lat.] A ſwelling in the form of a fig.

(1.) * CARIES. *n. ſ.* [Latin.] That rotttteneſs which is peculiar to a bone. *Quincy.*—Fiſtulas of a long continuance, are, for the moſt part accompanied with ulcerations of the gland, and *caries* in the bone. *Wiſeman's Surgery.*

(2.) CARIES. See MEDICINE and SURGERY, *Indexes.*

CARIGALINE, two towns of Ireland; 1. in Cork, Munſter: 2. in Leitrim, Connaught.

CARIGNANA, a town of France, in the department of Ardennes. It was formerly a provoſtſhip, called Ivoix, belonging to Luxemburg; but was ceded to Lewis XIV. who changed the name and erected it into a duchy. It is ſituated on the Chiers, 8 miles ESE. of Sedan.

(1.) CARIGNANO, a diſtrict of Piedmont.

(2.) CARIGNANO, a fortified town in the above diſtrict, (N° 1.) ſeated on the Po, about 7 miles S. of Turin. It was taken in 1544 by the French; who demoliſhed the fortifications, but ſpared the caſtle. It was alſo taken and retaken, in 1691. Lon. 7. 25. E. Lat. 44. 30. N.

CARIGTONHILL, in Cork, Ireland.

CARILLONEUR. See the next article.

CARILLONS, a ſpecies of chimes frequent in the ci-devant Netherlands, particularly at Ghent and Antwerp, and played on a number of bells in a belfrey, forming a complete ſcale of tones and ſemitones, like thoſe on the harpſichord and organ. There are petals communicating with the great bells, upon which the CARILLONEUR with his feet plays the baſe to ſprightly airs performed with the two hands upon the upper ſpecies of keys. Theſe keys are projecting ſticks, wide enough aſunder to be ſtruck with violence and velocity by either of the hands edgeways, without danger of hitting the neighbouring key. The player is provided with a thick leather covering for the little finger of each hand, to guard againſt the violence of the ſtroke. They are heard through a large town. The muſic bells of Edinburgh are a ſpecies of Carillons.

CARIMAN JAVA, a cluſter of E. Indian iſlands N. of Java, where European ſhips ſtop for refreſhments, in ſailing to Borneo. Lon. 110. 12. E. Lat. 5. 56. S.

CARIMPANIA, in botany, an Indian palm tree, deſcribed in the *Hortus Malabricus*, the leaves of which, when full grown, are 30 feet long, and 9 feet broad, or more, if carefully extended. It is the female plant of the *Boraſſus*, and is placed by Linnæus among thoſe of the *dubious order* in his ſexual ſyſtem; but in his natural method is ranked under the 1ſt order, *Palmæ.* See BORASSUS.

(1.) CARINA, [Lat.] the keel of a ſhip, or that long piece of timber running along the bottom of the ſhip from head to ſtern, upon which the whole ſtructure is built. It is alſo uſed for the whole capacity of a ſhip, containing all the ſpace below the deck; and ſometimes for the whole ſhip.

(2.) CARINA, among anatomiſts, is uſed, 1. to denote the *ſpina dorſi*; 2. the embryo of a chick appearing in an incubated egg. It conſiſts of the entire *vertebræ*, as they appear after 10 or 12 days incubation. It is thus called, becauſe crooked in the form of the keel of a ſhip.

(3.) CARINA, among botaniſts, is uſed for the lower petalum of a papilionaceous flower.

(4.) CARINA, in the ancient architecture, was a name given by the Romans to all buildings in form of a ſhip; as we ſtill give the name *nave* to the principal vault of our Gothic churches; becauſe it has that figure.

CARINÆ, women hired among the ancient Romans to weep at funerals: thus called from CARIA, the country whence moſt of them came.

CARINATED, *adj.* bent like a ſhip's keel.

CARINATUM. See BOTANY, *Gloſſary.*

CARINCHAM, a village in Cheſhire, 3 miles N. W. of Congleton.

CARINGTON, a hamlet of Bowden, Cheſhire.

CARINI, the ancient inhabitants of that part of Caledonia, now called STRATHNAVER.

CARINOLA, an epiſcopal town of Naples, in Terra di Lavoro, 20 miles N. of Naples. Lon. 15. 10. E. Lat. 41. 20. N.

CARINTHI, the people of CARINTHIA.

CARINTHIA, a duchy of Germany, in the circle of Auſtria, bounded by the archbiſhopric of Saltzburg on the N. by Carniola and the Venetian territories on the S. by Tyrol on the W. and by Stiria on the E. A part of this country was anciently called CARNIA, and the inhabitants CARNI. The air is cold, and the ſoil in general mountainous and barren; but there are ſome fruitful dales and valleys in it, which produce grain. The lakes, brooks, and rivers, which are very numerous, abound with fiſh; and the mountains yield lead and iron, and in many places are covered with woods. The river Drave, which runs acroſs the country, is the moſt conſiderable. The inhabitants are partly deſcendants of the ancient Germans, and partly of the Sclavonians. The ſtates are conſtituted as in Auſtria, and their aſſemblies are held at Clagenfurt. The archbiſhop of Saltzburg and the biſhop of Bamberg have conſiderable territories in this country. Chriſtianity was planted here in the 7th century. The only profeſſion tolerated is the Roman Catholic. The biſhops of Gurk and Lavant, are ſubject to the archbiſhop of Saltzburg. This duchy was formerly a part of Bavaria. In 1282, the emperor Rodolph I. gave it to Maynard count of Tyrol, on condition that when his male iſſue failed, it ſhould revert to the houſe of Auſtria; which happened in 1331. Carinthia has its particular governor or *land captain*, and contributes annually towards the expenſe of the military eſtabliſhment 637,695 florins. Only one regiment of foot is uſually quartered in it. This country was over-run by the French under Buonaparte, who had his head quarters at Villaſch in March 1797.

CARINUS, emperor of Rome. See CARUS.

* CARIOSITY. *n. ſ.* [from *carious*.] Rottenneſs.—This is too general, taking in all *carioſity* and ulcers of the bones. *Wiſeman's Surgery.*

CARIOSSE. See ABANGA.

* CARIOUS. *adj.* [*carioſus*, Lat.] Rotten.—I diſcovered the blood to ariſe by a *carious* tooth. *Wiſeman.*

CARIPI, a kind of cavalry in the Turkiſh army. Of theſe about 1000 are not ſlaves, nor bred up in the ſeraglio, like the reſt; but are generally Moors or renegado Chriſtians, who, being poor, and having their fortune to ſeek by their dexterity and courage, have arrived at the rank of horſe guards to the grand Signior.

CARISBROOK CASTLE, a caſtle ſituated in the middle of the iſle of Wight, in which king Charles I. was impriſoned. Lon. 1. 30. W. Lat. 50. 40. N.

CARISSA, in botany; a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 30th order, *Contortæ.* It has two many-ſeeded berries.

CARISSÆ. See CARIANS.

CARISTO, or CASTLE-ROSSA, an epiſcopal city of Greece, in the E. part of the iſland of Negropont, near Cape Lore. Lon. 24. 15. E. Lat. 38. 6. N.

CARITATIS POCULUM, the grace cup, was an extraordinary allowance of wine or other liquors, wherein the religious at feſtivals drank in commemoration of their founder and benefactors.

* CARK. *n. ſ.* [*cearc*, Sax.] Care; anxiety; ſolicitude; concern heedfulneſs. This word is now obſolete.—

And Klaius taking for his youngling *cark*,
Leſt greedy eyes to them might challenge lay,
Buſy with oker did their ſhoulders mark. *Sidney.*
He down did lay
His heavy head, devoid of careful *cark.* *Spenſer.*

* *To* CARK. *v. n.* [*cearcan*, Sax.] To be careful: to be ſolicitous; to be anxious. It is now very little uſed, and always in an ill ſenſe.—What can be vainer than to laviſh out our lives in the ſearch of trifles, and to lie *carking* for the unprofitable goods of this world? *L'Eſtrange.*—Nothing can ſupercede our own *carkings* and contrivances for ourſelves, but the aſſurance that God cares for us. *Decay of Piety.*

CARKANET, *n. ſ.* a necklace. *Aſh.*

CARKE, the 30th part a SARPLAR of wool.

CARL. See CARLE, *def.* 2.

CARLA, a village of France, in the department of Arriege, and ci-devant county of Foix. It was the birth place of the celebrated M. Bayle.

CARLANSTOWN, a town of Ireland, in the county of Neath, Leinſter, 33 miles from Dublin.

CARLBURY, in Durham, near Darlington.

CARLBY, in Lincolnſhire, N. of Stanford.

* CARLE. *n. ſ.* [*ceorl*, Sax.] 1. A mean, rude rough, brutal man. We now uſe *churl.*—

The *carle* beheld, and ſaw his gueſt

Would ſafe depart, for all his ſubtile flight. *Spenſer.*

Anſwer, thou *carl*, and judge this riddle right,
I'll frankly own thee for a cunning wight. *Gay.*

2. A kind of hemp.—The ſimple to ſpin and the *carl* for her ſeed. *Tuſſer.*

CARLENY, a ſmall lake in Ayrſhire.

(1.) CARLETON, a very ſteep hill in Ayrſhire, 518 yards above the ſea level. It is ſo near the bay, (N° 5.) that at full tide there is little more than room for travellers to paſs.

(2.) Carleton, Sir Dudley, was born in Oxfordſhire in 1573, and educated at Chriſt-church college. He went as ſecretary to Sir Ralph Winwood in the Netherlands, when king James reſigned the cautionary towns to the States: and was afterwards employed for 20 years as ambaſſador to Venice, Savoy, and the United Provinces. King Charles I. created him viſcount Dorcheſter, and appointed him one of his principal ſecretaries of ſtate; in which office he died in 1631. He was eſteemed a good ſtateſman, though an honeſt man; and publiſhed ſeveral political works. His French and Latin letters to Voſſius, were publiſhed with other correſpondence of that learned author, at London, in 1690.

(3,4.) Carleton, two villages; viz. 1. NE. of Buckenham: 2 in Nottinghamſhire, 4 miles SW. of Blith.

(5.) Carleton bay, a bay on the coaſt, Ayrſh.

CARLINA, the carline thistle: A genus of the polygamia æqualis order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The calyx is radiated with long coloured marginal ſcales. There are 7 ſpecies.

Carlina vulgaris, is the only one of the 7 that is a native of Britain. All the others are natives of the S. of France or Italy; and are very eaſily propagated in this country by ſeeds, which muſt be ſown on a bed of freſh undunged earth, where they are to remain, as they do not bear tranſplanting. When the plants appear above ground, they ſhould be carefully weeded, and afterwards thinned, leaving them about 10 or 12 inches aſunder. The 2d year moſt of them will flower: but, unleſs the ſeaſon proves dry, they rarely produce good ſeeds in this country, and ſome of the plants decay ſoon after they have flowered, ſo that it is pretty difficult to maintain them here. The roots are uſed in medicine, and for that purpoſe are imported. As we receive them they are about an inch thick, externally of a ruſty brown colour, corroded as it were on the ſurface, and perforated with numerous ſmall holes, appearing as if worm eaten. They have a ſtrong ſmell, and a ſub-acid, bitteriſh, weakly aromatic taſte. They are reckoned warm alexipharmics and diaphoretics. Hoffman the Elder relates that he has obſerved a decoction of them in broth occaſion vomiting. They have been for ſome time greatly eſteemed among foreign phyſicians; but never were much in uſe in this country. The preſent practice entirely rejects them, nor are they often to be met with in the ſhops.

(1.) CARLINE, or Caroline, a ſilver coin current in the Neapolitan dominions, worth about 4d.

(2.) Carline knees are timbers going athwart a ſhip, from the ſides to the hatch-way, ſerving to ſuſtain the deck on both ſides.

(3.) Carlines. See Carlings.

(4.) * Carline thistle. [*carlina*, Lat.] A plant. *Miller.*

(1.) CARLINGFORD, a port town of Ireland, ſeated on the bay, (N° 2.) in the county of Louth, Leinſter, 22 miles N. of Drogheda, and 52 from Dublin. Lon. 6. 24. W. Lat. 54. 11. N.

(2.) Carlingford bay, a bay of Ireland, on the coaſt of Leinſter, in which, the largeſt veſſels may anchor. It is between 3 and 4 miles long, and as many broad. Very fine oyſters are taken in it.

(1.) * CARLINGS. *n. ſ.* [In a ſhip.] Timbers lying fore and aft, along from one beam to another; on theſe the ledges reſt, on which the planks of the deck are made faſt. *Harris.*

(2.) Carlings ſerve as a foundation for the whole body of the ſhip. They have their ends let into the beams, called *culver-tail-wiſe.*

CARLINGTHWATE hall, NE. of Alfreton.

(1.) CARLINWARK, a village in the county of Kirkcudbright, now called Castle-douglas, which ſee.

(2.) Carlinwark loch, a lake in Kirkcudbrightſhire, originally 116 ſquare acres in extent, but reduced in 1765 to 80, ten feet of water being then taken off by a canal to the Dee. It is a great ſource of improvement to the adjacent grounds, as it contains an unexhauſtible fund of the very beſt ſhell marl. It was ſold in 1788, for 2000 l. ſterling. Before it was drained there were two iſles in it, at the N. and S. ends, on which water fowls bred in great abundance. Many antiquities were found in it; particularly a braſs dagger, plated with gold, 22 inches long, and ſeveral canoes hollowed out like thoſe of the American Indians.

(1.) CARLISLE, an ancient city of Cumberland, and capital of the county, ſeated S. of the river Eden, between the Pettered on the E. and the Caude on the W. It is ſurrounded by a ſtrong ſtone wall, and has a pretty large caſtle in the W. part of, it with a citadel in the E. built by Henry VIII. It flouriſhed in the time of the Romans, as appears from the antiquities ſtill met with, and the Roman coins that have been dug up. At the departure of the Romans this city was ruined by the Scots and Picts; and was not rebuilt till A. D. 680, by Egfrid, who encompaſſed it with a wall, and repaired the church. In the 8th and 9th centuries, the whole country was again ruined, and the city laid deſolate by the incurſions of the Norwegians and Danes. In this condition it remained, till the time of William II. who rebuilt it and repaired the walls and caſtle. It was fortified as a barrier againſt Scotland, by Henry I, who placed a garriſon in it, and in 1136, made it an epiſcopal ſee, ſuffragan to the archbiſhop of York. It was twice taken by the Scots, and afterwards burnt accidentally in the reign of Richard II. The cathedral, the ſuburbs, and 1500 houſes, were deſtroyed at that time. It is in a good condition: and has 3 gates, the Engliſh on the S. the Scotch on the N. and the Iriſh on the W. It has two

pariſhes

mon. Agriculture is of late much improved, particularly graſs farming. The banks of the Clyde are ſamous for fruit, and in the pariſh of Carluke, apples and pears are produced in greater abundance than perhaps in any other diſtrict in Scotland. The orchards extend about 5 miles. In 1789, the fruits and undergrowth drew above 700l. Free-ſtone, lime-ſtone, and iron-ſtone abound, and there are ſome rich veins of coal. The population in 1801, was 1756, and had increaſed 497 ſince 1755. The roads are good, and there are 5 mills in the pariſh.

(2.) Carluke a village in the above pariſh, (N° 1.) In 1786, it conſiſted of only 4 or 5 houſes, but it is now very populous and flouriſhing. It has fairs, 1ſt Thurſday in February, 21ſt May, and laſt Wedneſday in July.

(3.) Carluke burn, a rivulet in Carluke.

CARLYLE, Joſeph Dacres, an Engliſh divine, famous for his oriental learning, was born at Carliſle in 1759, where his father practiſed phyſic with conſiderable reputation. After receiving the uſual courſe of grammar-ſchool education in Carliſle, he was removed to Chriſt's college, Cambridge; and having reſided about two years there, he was admitted of Queen's college, and obtained a fellowſhip. He now began to ſtudy the Arabic language, in which he made uncommon progreſs; and, with the aſſiſtance of David Zabio, an Aſiatic, born at Bagdad, and then reſiding at Cambridge, he entered on the ſtudy of the other oriental tongues. Having continued about 10 years in college, during which he proceeded to his degree of B. D. he married and ſettled at Carliſle. He was choſen profeſſor of Arabic on the reſignation of Dr Craven, in 1794; and collated to the chancellorſhip of Carliſle, in 1795. In 1796, he publiſhed *Specimens of Arabian Poetry*, with elegant tranſlations, and brief memoirs of the authors. In 1799, he accompanied lord Elgin in his embaſſy to Conſtantinople; where he gained admittance to the libraries, and made catalogues of the works they contained; and from whence he made excurſions into Aſia Minor, and explored, with intereſting accuracy, the ſite of ancient Troy. Having viſited Egypt, Syria, and the Holy Land, gleaning literary treaſures wherever he went, he returned to Conſtantinople, from whence he travelled through Italy and Germany to England, where he landed in the end of 1801. The biſhop of Carliſle ſoon after preſented him to the rich rectory of Newcaſtle upon Tyne; but his travels had injured his conſtitution, and to the great loſs of literature, this worthy and ingenious man died at Newcaſtle in 1804. About the time of his death he was engaged in ſuperintending an edition of the Arabic bible; a Diſſertation on the Troad; and Obſervations made during his Tour in the Eaſt.

CARMAGNIOLA, a fortified town of Italy, in Piedmont, with a good caſtle. It was taken by the French, and retaken by Prince Eugene in 1691. It is ſeated in a country abounding in corn, flax, and milk, near the Po. Lon. 7. 32. E. Lat. 44. 43. N.

* CARMAN. *n. ſ.* [from *car* and *man*.] A man whoſe employment is to drive cars —

If the ſtrong cane ſupport thy walking hand,
Chairmen no longer ſhall the wall command;
E'en ſturdy *carmen* ſhall thy nod obey,
And rattling coaches ſtop to make thee way.
Gay's Trivia.

CARMANIA, in ancient geography, a country of Aſia, E. of Perſia, having Parthia on the N. Gedroſia on the E. the Perſian Gulf and the Indian or the Carmanian Sea on the S. Its name was derived from the Syriac, *carma*, a vine, for which it was famous, yielding cluſters of grapes 3 feet long. It is now called Kerman, or Carimania, and is a province of modern Perſia. It was anciently divided into

1. Carmania Deserta, S. of Parthia: and,
2. Carmania Propria, S. of Carmania Deſerta, quite to the ſea.

CARMARTHEN. See Caermarthen.

(1.) CARMEL, a high mountain of Paleſtine, ſtanding on the ſkirts of the ſea, and forming the moſt remarkable head-land on all that coaſt. It extends E. as far as the plain of Jezreel, and from the city of that name quite to Cæſarea on the S. It ſeems to have had the name of *Carmel* from its great fertility; this word, in Hebrew, ſignifying the *vine of God*, and being uſed in ſcripture to denote any fruitful ſpot. Mr Sandy's acquaints us that, when well cultivated, it abounds with olives, vines, and variety of fruits and herbs, both medicinal and aromatic. Others, however, repreſent it as rather dry and barren; which perhaps may have happened from the neglect of agriculture ſo common in all parts of the Turkiſh empire, eſpecially where they are expoſed to the incurſions of the Arabs. Carmel has been greatly revered both by Jews and Chriſtians, from its having been the reſidence of the prophet Elijah, who is ſuppoſed to have lived there in a cave (which is there ſhewn) before he was taken up into heaven.

(2.) Carmel, a city built on the mount.

(3.) Carmel, a pagan deity worſhipped in the city, (N° 2.) but without either temple or ſtatue: though anciently there muſt have been a temple, as we are told that this mountain was a favourite retreat of Pythagoras, who ſpent a good deal of time in the temple, without any perſon with him.

* CARMELITE. *n. ſ.* [*carmelite*, Fr.] A ſort of pear.

Carmelites, one of the four tribes of mendicant friars; ſo named from mount Carmel. They pretend to deſcend in an uninterrupted ſucceſſion from Elijah; Eliſha, and the ſons of the prophets. The manner in which they make out their antiquity is too ridiculous to be rehearſed. Some pretend they are deſcendants of Jeſus Chriſt; others make Pythagoras a Carmelite, and the ancient druids regular branches of their order. Phocas, a Greek monk, ſpeaks the moſt reaſonably. He ſays, that in his time, 1185, Elias's cave was ſtill extant on the mountain; near which were the remains of a building, which intimated that there had been anciently a monaſtery; that ſome years before, an old monk, a prieſt of Calabria, by revelation, as he pretended, from the prophet Elias, fixed there, and aſſembled ten brothers. In 1209, Albert, patriarch of Jeruſalem, gave the ſolitaries a rigid rule, which Papebroch has ſince printed.

In 1217, or, according to others, 1226, pope Honorius III. approved and confirmed it. This rule contained 16 articles. Theſe confined them to their cells; enjoined them to continue day and night in prayer; prohibited their having any property; enjoined faſting from the feaſt of the holy croſs till Eaſter, except on Sundays; abſtinence at all times from fleſh; obliged them to manual labour; impoſed a ſtrict ſilence on them from veſpers till the tierce the next day, &c. The peace concluded by the emperor Frederick II. with the Saracens, in 1229, occaſioned the Carmelites to quit the Holy Land, under Alan the 5th general of the order. He firſt ſent ſome of the religious to Cyprus, who landed there in 1238, and founded a monaſtery in the foreſt of Fortania. Some Sicilians, at the ſame time leaving mount Carmel, returned to their own country, where they found a monaſtery in the ſuburbs of Meſſina. Some Engliſh monks departed out of Syria, in 1240, to found others in England. Others of Provence, in 1244, founded a monaſtery in the deſart of Aigualates, a league from Marſeilles; and thus, the number of their monaſteries increaſing, they held their European general chapter in 1245, at their monaſtery of Aylesford, in England. This order is ſo much increaſed, that it has, at preſent, 38 provinces, beſides the congregation of Mantua, in which are 54 monaſteries, under a vicar-general; and the congregations of barefooted Carmelites in Italy and Spain, which have their peculiar generals. After the eſtabliſhment of the Carmelites in Europe, their rule was in ſome reſpects altered; the firſt time, by pope Innocent IV. who added to the firſt article a precept of chaſtity, and relaxed the 11th, which enjoins abſtinence at all times from fleſh, permitting them, when they travelled, to eat boiled fleſh. He likewiſe allowed them to eat in a common refectory, and to keep aſſes or mules for their uſe. The rule was again mitigated by the popes Eugenius IV. and Pius II. Hence the order is divided into two branches, viz. *the Carmelites of the ancient obſervance*, called the *moderate* or *mitigated*; and thoſe *of the ſtrict obſervance*, who are the *barefooted Carmelites*; a reform ſet on foot in 1540, by S. Thereſa, a nun of the convent of Avila, in Caſtile; theſe laſt are divided into two congregations, that of Spain, and that of Italy. The habit of the Carmelites was at firſt white, and the cloak laced at the bottom with ſeveral liſts. But pope Honorius IV. commanded them to change it for that of the Minims. Their ſcapulary is a ſmall woollen habit of a brown colour thrown over their ſhoulders. They wear no linen ſhirts; but inſtead of them linſey wolſey, which they change twice-a-week in the ſummer, and once a-week in the winter. If a monk of this order lies with a woman, he is prohibited ſaying maſs for 3 or 4 years, is declared infamous, and obliged to diſcipline himſelf publicly once a-week. If he is again guilty of the ſame fault, his penance is doubled; and if a third time, he is expelled the order.

CARMEN, an ancient term among the Latins, uſed in various ſenſes; as, 1. a verſe: 2. a ſpell, charm, form of expiration or execration, couched in few words, in a myſtic order, on which its efficacy depended. In this ſenſe Pezron derives the word from the Celtic *carm*, the ſhout of joy, or the verſes which the ancient bards ſing to encourage the ſoldiers before the combat: 3. a denomination given to precepts, laws, prayers, imprecations, and all ſolemn formulæ couched in a few words, placed in a certain order, though written in proſe. In this ſenſe, the elder Cato wrote a *Carmen de moribus*, in proſe.

CARMENTA, or CARMETIS, in fabulous hiſtory, a propheteſs of Arcadia, and the mother of Evander, with whom ſhe came into Italy 60 years before the Trojan War.

CARMENTALIA, a feaſt among the ancient Romans, celebrated annually on the 11th Jan. in honour of CARMENTA, and repeated on the 15th which is marked in the old calendar by *Carmentalia relata*. This feaſt was eſtabliſhed on occaſion of a great fecundity among the Roman dames, after a great reconciliation with their huſbands, with whom they had been at variance, becauſe the uſe of coaches had been prohibited by the ſenate. This feaſt was celebrated by the women: he who offered the ſacrifices was called *ſacerdos carmentalis*.

CARMICHAEL, a pariſh of Scotland, in Lanarkſhire, 5 miles long and 4 broad. The ſurface is unequal, the ſoil very various, and the climate cold and wet; though far from unhealthy, the people often living to a great age. The plantations made by the late E. of Hyndford are ſo extenſive, that the ſtone and earthen fences around them are ſaid to meaſure 35 miles. Agriculture, however, is ſtill moſtly carried on in the old manner. Oats and barley are the chief crops. There is a good lime work, and a colliery, from which above 70,000 loads of coals are ſold annually. A tannery and ſome weaving are alſo carried on in the pariſh. The population, in 1801, was 832, and had decreaſed 67 ſince 1755.

(1.) * CARMINATIVE. *adj.* [ſuppoſed to be ſo called, as having *vim carminis*, the power of a charm.] *Carminatives* are ſuch things as dilute and relax at the ſame time, becauſe wind occaſions a ſpaſm, or convulſion, in ſome parts. Whatever promotes inſenſible perſpiration, is *carminative*; for wind is perſpirable matter retained in the body. *Arbuthnot on Aliments.*—

Carminative and diuretick
Will damp all paſſion ſympathetick. *Swift.*

(2.) CARMINATIVES (N° 1.) comprehend coriander ſeeds, aniſeed, peppermint, and the like medicines, uſed in colics, or other flatulent diſorders, to diſpel wind. The word comes from the Latin *carminare*, to card to teaze wool, and figuratively to attenuate and diſcuſs wind or vapours, and promote their diſcharge by perſpiration. Dr Quincy ſays it comes from *carmen*, a charm; and ſuppoſes it to have been a general name for all medicines which operated, like charms, in an extraordinary manner. Hence, as the moſt violent pains frequently aroſe from wind, and immediately ceaſed upon its diſperſion, the term *carminative* was applied to medicines which gave relief in windy caſes, as if they cured by inchantment. It is now almoſt obſolete.

(1.) * CARMINE. *n.ſ.* A bright red or crimſon colour, bordering on purple, uſed by painters in minature. It is the moſt valuable product of the cochineal maſtick, and of an exceſſive price. *Chambers.*

(2.) CARMINE. See COLOUR-MAKING.

CARMINO, a town, S. of Heſton, Cornwall.

(1.) CARMONA, an ancient town of Spain, in Andaluſia. The gate towards Seville is one of the moſt extraordinary pieces of antiquity in all Spain. Carmona is ſeated in a fertile country, 15 miles E. of Seville. Lon. 5. 37. W. Lat. 37. 24. N.

(2.) CARMONA, a town of Italy, in Friuli, in the county of Goritz, ſeated on a mountain near the river Indri. Lon. 5. 37. E. Lat. 46. 15. N.

CARMONY, a village in Antrim, Ireland.

CARMUNNOCK, a pariſh of Scotland, in Lanarkſhire, about four miles in length, and three in breadth. The greater part is elevated, and commands a moſt extenſive proſpect; the ſoil is partly a light quick mould, and partly a ſtrong deep clay, which, when properly drained, produces excellent crops; ſome of it alſo conſiſts of a ſhallow clay mixed with ſand, which will not bear a ſucceſſion of crops, without being every year nouriſhed with a rich manure. Of the whole extent, which is about 250 acres, nearly 1000 are employed in paſturage; the reſt is generally incloſed. In many parts there are coal and limeſtone, neither of which have been wrought to any extent: there is alſo plenty of ironſtone, and extenſive quarries of freeſtone. The population, in 1801, was 570.

CARMYLEFIELD, a village in Old Monkland pariſh, in the County of Lanark, noted for an extenſive muſlin manufactory.

CARMYLIE, a pariſh of Scotland in Angusſhire, 3 miles long from E. to W. and 4 broad. The ſurface is hilly, and the ſoil wet and ſpungy; but ſo much improved, that it produces 4 times the quantity of grain it did 28 years ago. The population, in 1801, was 892.

CARNABADIUM, a name given by the Greek and Arabian phyſicians, to caraway and Ethiopian cummin.

CARNABY, a town near Bridlington, Yorkſh.

* CARNAGE. *n. ſ.* [*carnage*, Fr. from *caro*, *carnis*, Lat.] 1. Slaughter; havock; maſſacre.—He brought the king's forces upon them rather as to *carnage* than to fight, inſomuch as, without any great loſs or danger to themſelves, the greateſt part of the ſeditious were ſlain. *Hayward.* 2. Heaps of fleſh.—

His ample maw with human *carnage* fill'd,
A milky deluge next the giant ſwill'd. *Pope.*

* CARNAL. *adj.* [*carnal*, Fr. *carnalis*, low Lat.] 1. Fleſhly; not ſpiritual.—He perceives plainly, that his appetite to ſpiritual things abates, in proportion as his ſenſual appetite is indulged and encouraged; and that *carnal* deſires kill not only the deſire, but even the power, of taſting purer delights. *Atterbury.* 2. Luſtful; lecherous; libidinous.—

This *carnal* cur
Preys on the iſſue of his mother's body. *Shak.*

* CARNALITY. *n. ſ.* [from *carnal*.] 1. Fleſhly luſt; compliance with carnal deſires.—If godly, why do they wallow and ſleep in all the *carnalities* of the world, under pretence of chriſtian liberty? *South.* 2. Groſſneſs of mind.—He did not inſtitute this way of worſhip, but becauſe of the *carnality* of their hearts, and the proneneſs of that people to idolatry. *Tillotſon.*

* CARNALLY. *adv.* [from *carnal*.] According to the fleſh; not ſpiritually.—In the ſacrament we do not receive Chriſt *carnally*, but we receive him *ſpiritually*; and that of itſelf is a conjugation of bleſſings and ſpiritual graces. *Taylor.*

* CARNALNESS. *n. ſ.* The ſame with *carnality*. *Dict.*

CARNARIUM, *n. ſ.* a charnel houſe. *Aſh.*

CARNARVON. See CAERNARVON, N° 1, & 2.

CARNATIC, a rich, populous and fertile country of Hindooſtan, bounded, according to ſome geographers, by the kingdoms of Meſſaur and Tanjore on the S. Viſiapour on the W. the river Kiſtna on the N. and the bay of Bengal on the E. and extending about 350 miles in length from N. to S. and 270 in breadth from E. to W. Mr Walker, however, ſays, " it is 570 miles in length from N. to S. but no where more than 120, and commonly only 75 miles wide;" and that it extends " from the Guntoo Circar, along the whole coaſt of Coromandel, to Cape Comorin; including its appendages, which are *Tanjore*, Maravar, Trinchinopoly, Madura, and Tinevelly." This country contains an incredible number of fortreſſes and public monuments: the unequivocal marks of civilization and opulence, are more common here than in the north parts of India. The principal rivers are the Pennar, Palia, and Cauvery. The revenue of the ſovereign, the nabob of Arcot, was uſually computed at 1,500,000 l. a year. He was one of the moſt ancient and faithful allies of the Britiſh government in India, and it is affirmed, was indebted to their aſſiſtance for his eſtabliſhment in his government. By a treaty of alliance entered into between them, the Nabob engaged to pay our government a ſubſidy of 15 lacks, which was afterwards reduced to 9 lacks of pagodas, and not to enter into alliance with any European or other power without their concurrence. By the original records of Tippo Sultan, found after the fall of Seringapatam, it however appeared, that the Nabobs of the Carnatic had ſucceſſively carried on a ſecret correſpondence with him ſubverſive of this alliance, and incompatible with the ſecurity of the Britiſh poſſeſſions. This was accounted a ſufficient ground for the Britiſh ſeizing on the entire civil and military government of the Carnatic, to which the hereditary Nabob was forced to accede, " diveſting himſelf of all controul, authority, or interference, in the collection of the revenue, or in the adminiſtration of civil and criminal judicature." The Britiſh poſſeſſions in the Carnatic were formerly confined to the tract called Jaghire, and their revenue from the whole was valued at 160,000 l.

(1.) * CARNATION. *n. ſ.* [*carnes*, Lat.] The name of the natural fleſh colour; from whence perhaps the flower is named; the name of a flower.—

And lo the wretch? whoſe vile, whoſe inſect luſt
Laid this day daughter of the ſpring in duſt:
O puniſh him! or to th' Elyſian ſhades
Diſmiſs my ſoul, where no *carnation* fades.
Pope.

(2.) CARNATION, in botany. See DIANTHUS.

(3.) CARNATION, among dyers. To dye a carnation,

nation, or red roſe colour, take liquor of wheat bran a ſufficient quantity; alum, 3 lb.; tartar, 2 oz.; boil them and enter 20 yards of broad cloth; after it has boiled 3 hours, cool and waſh it: take freſh clear bran liquor a ſufficient quantity; madder, 5 lb.; boil and ſodden according to art. The Bow-dyers know that the ſolution of jupiter, or delved tin, being put in a kettle to the alum and tartar, in another proceſs, makes the cloth, &c. attract the colour into it, ſo that none of the cochineal is left, but the whole is abſorbed.

(4.) **Carnation-colour**, among painters, is underſtood of all the parts of a picture, in general, which repreſent fleſh, or which are naked and without drapery. Titian and Corregio in Italy, and Rubens and Vandyke in Flanders, excelled in carnations.—In colouring for fleſh, there is ſo great a variety, that it is hard to lay down any general rules for inſtruction therein; neither are there any regard by thoſe who have acquired a ſkill this way. The various colouring for carnations may be eaſily prodoced, by taking more or leſs red, blue, yellow, or biſtre, whether for the firſt colouring, or for the finiſhing: the colour for women ſhould be bluiſh, for children a little red, both freſh and gay; and for the men it ſhould incline to yellow, eſpecially if they are old.

(5.) **Carnation, Spanish.** See Poinciana.

(6.) **Carnation tree.** See Cacalia, § I. N° 6.

CARNAVAL. See Carnival.

(1.) CARNBEE, [Gael. *i.e.* birch-hill,] a pariſh of Fife-ſhire, about 4 miles ſquare. The ſoil is fertile, conſiſting of clay, loam, and a rich black earth. The farms are of various ſizes and rent at from L.20 to L.300 per annum. The crops are wheat, barley, peaſe, oats, turnips, and potatoes. The population, in 1801, was 1083, and had decreaſed 210, ſince 1755.

(2.) **Carnbee Law**, a hill in Carnbee, N° 1.

CARNDONACH, a town in Donegal, Ireland.

CARNEADES, a celebrated Greek philoſopher, born at Cyrene, in Africa, and founder of the 3d academy. He was ſo fond of ſtudy, that he not only avoided all entertainments, but forgot even to eat at his own table; his maid-ſervant Meliſſa was obliged to put the victuals into his hand. He was an antagoniſt of the Stoics; and applied himſelf with great eagerneſs to refute the works of Chryſippus, one of the moſt celebrated philoſophers of their ſect. The power of his eloquence was dreaded even by the Roman ſenate. The Athenians being condemned by the Romans to pay a fine of 500 talents for plundering the city of Oropus, ſent Carneades, Diogenes, and Critolaus, to Rome, as ambaſſadors, who got it mitigated to 100 talents. Before they had an audience of the ſenate, they harangued to great multitudes in different parts of the city. Carneades's eloquence was diſtinguiſhed by its ſtrength and rapidity. Cato the elder moved, that theſe ambaſſadors ſhould be immediately ſent back, as it was very difficult to diſcern the truth through the arguments of Carneades. The youth at Rome were ſo charmed by his orations, that they forſook their diverſions, and were carried with a kind of madneſs to philoſophy, which ſpread like enthuſiaſm. This grieved Cato, who was particularly afraid of that ſubtilty of wit, with which Carneades maintained either ſide of a queſtion. He harangued in favour of juſtice one day, and the next day againſt it, to the admiration of all who heard him, among whom were Galba and Cato, the greateſt orators of Rome. This was his element; he delighted in demoliſhing his own work, becauſe it ſerved to confirm his grand principle, that there are only reſemblances of truth in the mind of man; ſo that of two things directly oppoſite, either may be choſen indifferently. Quintilian remarks, that though Carneades argued in favour of injuſtice, yet he himſelf acted according to the ſtricteſt rules of juſtice. The following was a maxim of Carneades: "If a man privately knew that his enemy, or any other perſon, whoſe death might be of advantage to him, would come to ſit down on graſs, in which there lurked an aſp, he ought to give him notice of it, though it were in the power of no perſon whatever to blame him for being ſilent." Carneades lived to be 85 years old; ſome ſay 90: his death is placed in the 4th year of the 162d Olympiad.

CARNEDDE, in Britiſh antiquity, heaps of ſtones ſuppoſed to be druidical remains, and thrown together at confirming a covenant. Gen. xxxi. 46. They are very common in the iſle of Angleſey, (ſee Anglesey, § 2.) and were alſo uſed as ſepulchral monuments, in the manner of *tumuli*; for Mr Rowland found a curious urn in one of theſe carnedde. Hence it may be inferred, that the Britons had the cuſtom of throwing ſtones on the deceaſed. From this cuſtom is derived the Welch proverb, *Karn ardyben*, ill betide thee.

CARNEIA, in antiquity, a feſtival in honour of Apollo, ſurnamed Carneus, held in moſt cities of Greece, but eſpecially at Sparta, where it was firſt inſtituted. The reaſon of the name, as well as the occaſion of the inſtitution, is controverted. It laſted 9 days, beginning on the 13th day of the month *Carneus*. The ceremonies were an imitation of the method of living and diſcipline uſed in camps.

CARNEIL, a hill in Fifeſhire, which commands a fine view of the Frith of Forth. About 100 acres upon it are in high cultivation.

CARNEL. The building of ſhips firſt with their timber and beams, and after bringing on their planks, is called *carnel work*, to diſtinguiſh it from clinch work. Veſſels alſo, which go with mizzen ſails inſtead of main ſails, are by ſome called carnels.

CARNELIAN, or (1.) CARNELION, in natural hiſtory, a precious ſtone, of which there are 3 kinds, diſtinguiſhed by 3 colours, a red, a yellow, and a white. The red is very well known among us; is found in roundiſh or oval maſſes, like our common pebbles; and is generally met with between one inch and 2 or 3 inches in diameter; it is of a fine, compact, and cloſe texture; of a gloſſy ſurface; and of all the degrees of red, from the paleſt fleſh colour to the deepeſt blood red. It is generally free from ſpots, clouds, or variegations; but ſometimes it is veined very beautifully with an extremely pale red, or with white; the veins forming concentric circles, or other leſs regular figures, about a nucleus, in the manner of thoſe of agates. The pieces of carnelian, which are all of one colour, and perfectly free from veins, are thoſe which our jewellers generally make uſe of for ſeals, though the variegated ones are much more beautiful. For this purpoſe it is excellently adapted, being not too hard for cutting, and yet hard enough not to be liable to accidents, to take a good poliſh, and to ſeparate eaſily from the wax. It is not at all affected by acid menſtruums: the fire diveſts it of a part of its colour, and leaves it of a pale red; but a ſtrong and long continued heat will reduce it to a pale dirty grey. The fineſt carnelians are thoſe of the Eaſt Indies; but there are very beautiful ones found in the rivers of Sileſia and Bohemia; and we have ſome good ones in Britain.

(2.) * Carnelion. *n.ſ.* A precious ſtone.—The common *carnelion* has its name from its fleſh colour; which is, in ſome of theſe ſtones, paler, when it is called the female *carnelion;* in others deeper, called the male. *Woodward.*

* CARNEOUS. *adj.* [*carneus*, Lat.] Fleſhy.—In a calf, the umbilical veſſels terminate in certain bodies, divided into a multitude of *carneous* papillæ. *Ray.*

(1.) CARNERO, in geography, that part of the gulph of Venice which extends from the W. coaſt of Iſtria to the iſland of Groſſa and the coaſt of Morlachia.

(2.) Carnero is likewiſe the name of the cape W. of the mouth of the bay of Gibraltar.

CARNESVILLE, a town of the United States, in Franklin county, Georgia; about 100 miles NW. of Auguſta.

CARNEUS. See Carneia.

CARNEW, a town of Ireland, in the county of Wicklow, 44 miles from Dublin.

CARNEY, a diſeaſe in horſes, wherein their mouths become ſo furred that they cannot eat.

Carney Hill, or Cairney-hill, a village in Carnock pariſh, Fife-ſhire, which has upwards of 400 inhabitants.

(1.) CARNI, a tribe of Scythians, the ancient inhabitants of Carniola.

(2.) Carni. See Carinthia.

CARNIA, the ancient name, 1. of Carinthia: and, 2. of Carniola.

CARNICULA, a caruncle, particularly that fleſhy ſubſtance which inveſts the teeth.

CARNID, in natural hiſtory, a name given by Averrhoes to what is called Zarnich by more ancient writers.

CARNIFEX, among the Romans, the common executioner. By reaſon of the odiouſneſs of his office, he was expreſsly prohibited from having his dwelling-houſe within the city. In middle age writers, carnifex denotes a butcher. Under the Anglo-Daniſh kings, the carnifex was an officer of great dignity; being ranked with the archbiſhop of York, earl Goodwin, and the lord ſteward. Flor. Wigorn. ann. 1040. *Rex Hardecanutus Alfricum Ebor. Archiep. Goodwinum comitem, Edricum diſpenſatorem, Thrond ſuum* carnificem, *&* *alios magnæ dignitatis viros Londinum miſit.* The public executioner was alſo an office of dignity, under the kings of Iſrael. See Benaiah.

* *To* CARNIFY. *v. n.* [from *caro*, *carnis*, Lat.] To breed fleſh; to turn nutriment into fleſh.—At the ſame time I think, I deliberate, I purpoſe, I command: in inferiour faculties, I walk, I ſee, I hear, I digeſt, I ſanguify, I *carnify*. *Hale.*

CARNIOLA, a duchy of Germany, ſo named from its ancient inhabitants, the Carni; bounded on the S. by the Adriatic ſea, and part of Iſtria; on the N. by Carinthia and Stiria; on the E. by Sclavonia and Croatia; on the W. by Friuli, the county of Goritz, and a part of the gulph of Venice; extending in length about 110 miles, and in breadth about 50. Carniola is full of mountains, ſome of which are cultivated and inhabited, ſome covered with wood, others naked and barren, and others continually buried in ſnow. The valleys are very fruitful. Here are likewiſe mines of iron, lead, and copper; but ſalt muſt be had from the ſovereign's magazines. There are ſeveral rivers, beſides many medicinal ſprings and inland lakes. The common people are very hardy, going barefooted in winter through the ſnow, with open breaſts, and ſleeping on a hard bench without bed or bolſter. Their food is alſo very coarſe and mean. In winter, when the ſnow lies deep on the ground, the mountaineers bind either ſmall baſkets, or long thin narrow boards, like the Laplanders, to their feet, on which, with the help of a ſtout ſtaff, they deſcend with great velocity from the mountains. When the ſnow is frozen, they make uſe of a ſort of ſkaits. In different parts the inhabitants differ greatly in their dreſs, language, and manner of living. In Upper and Lower Carniola they wear long beards. The languages chiefly in uſe are the Sclavonian, and German. The duchy is divided into the Upper, Lower, Middle, and Inner, Carniola. The principal commodities exported are, iron, ſteel, lead, quickſilver, white and red wine, oil of olives, cattle, ſheep, cheeſe, linen and a kind of woollen ſtuff called *mahalan*, Spaniſh leather, honey, walnuts, and timber; together with all manner of wood work, as boxes, diſhes, &c. Chriſtianity was firſt planted here in the 8th century. Lutheraniſm made a conſiderable progreſs in it; but, excepting the Walachians or Uſkokes, who are of the Greek church, and ſtyle themſelves *Staraverzi*, i. e. old believers, all the inhabitants are Roman Catholics. Carniola was long a marquiſate, but in 1231 was erected into a duchy. As its proportion towards the maintenance of the army, it pays annually 363,171 florins; but only two regiments of foot are quartered in it.

(1.) * CARNIVAL. *n.ſ.* [*carnaval*, Fr.] The feaſt held in the popiſh countries before Lent; a time of luxury.—The whole year is but one mad *carnival*, and we are voluptuous not ſo much upon deſire or appetite, as by way of exploit and bravery. *Decay of Piety.*

(2.) Carnival, or Carnaval, is obſerved with great ſolemnity by the Italians, particularly at Venice, holding from the 12th day till Lent. Mr Du Cange derives the word from *Carn-a-val*, by reaſon the fleſh then goes to pot, to make amends for the ſeaſon of abſtinence next enſuing. Accordingly in the corrupt Latin, he obſerves, it was called *Carnelevamen*, and *Carniſprivium;* as the Spaniards ſtill denominate it *carnes tollendas.* Feaſts, balls, operas, concerts of muſic, marriages, intrigues, &c. are chiefly held in carnival times.

It begins at Venice the 2d holiday in Chriſtmas; when they wear maſks, and open their play houſes and gaming houſes; the place of St Mark is filled with mountebanks, jack-puddings, pedlars, whores, and ſuch like, who flock thither from all parts. There have been ſometimes no leſs than 7 ſovereign princes and 30,000 foreigners to partake of theſe diverſions.

(1.) * CARNIVOROUS. *adj.* [from *carnis* and *voro.*] Fleſh-eating; that of which fleſh is the proper food.—In birds there is no maſtication or comminution of the meat in the mouth: but in ſuch as are not *carnivorous*, it is immediately ſwallowed into the crop or craw. *Ray on the Creation.*—Man is by his frame, as well as his appetite, a *carnivorous* animal. *Arbuthnot on Aliments.*

(2.) CARNIVOROUS is an epithet applied to thoſe animals, which naturally ſeek and feed on fleſh. It has been a diſpute among naturaliſts, whether man is naturally carnivorous. Thoſe who take the negative ſide, inſiſt chiefly on the ſtructure of our teeth, which are moſtly inciſores or molares; not ſuch as *carnivorous* animals are furniſhed with, and which are proper to tear fleſh in pieces: to which it may be added, that, even when we do feed on fleſh, it is not without a preparatory alteration by boiling, roaſting, &c. and even then that it is the hardeſt of digeſtion of all foods. To theſe arguments Dr Wallis ſubjoins another, which is that all quadrupeds which feed on herbs or plants have a long colon, with a cœcum at the upper end of it, or ſomewhat equivalent, which conveys the food by a long and large progreſs, from the ſtomach downwards, in order to its ſlower paſſage and longer ſtay in the inteſtines; but that, in carnivorous animals, ſuch cœcum is wanting, and inſtead thereof there is a more ſhort and ſlender gut, and a quicker paſſage through the inteſtines. Now, in man, the cœcum is very viſible: a ſtrong preſumption that he was not intended for a carnivorous animal. It is true, the cœcum is ſmall in adults, and ſeems of little uſe; but in a fœtus it is much larger in proportion: And it is probable, our cuſtomary change of diet, as we grow up, may occaſion this ſhrinking. But to theſe arguments, Dr Tyſon replies, that if man had been deſigned not to be carnivorous, there would doubtleſs have been found, ſomewhere on the globe, people who do not feed on fleſh; which is not the caſe. Neither are carnivorous animals always without a colon and cœcum; nor are all animals carnivorous which have thoſe parts: the opoſſum, for inſtance, hath both a colon and cœcum, and yet feeds on poultry and other fleſh; whereas the hedge-hog, which has neither colon nor cœcum, and ſo ought to be carnivorous, feeds only on vegetables. Add to this, that hogs, which have both, will feed upon fleſh when they can get it; and rats and mice, which have large cœcums, will feed on bacon as well as bread and cheeſe. Laſtly, the human race are furniſhed with teeth neceſſary for the preparation of all kinds of foods; whence it would ſeem, that we are intended to live on all. And as the alimentary duct in the human body is fitted for digeſting all kinds of food, ought we not rather to conclude, that nature did not intend to deny us any? It is no leſs diſputed whether mankind were carnivorous before the flood. St Jerom, Chryſoſtom, Theodoret, and other ancients, maintain, that all animal food was then forbidden; which opinion is alſo ſtrenuouſly ſupported among the moderns by Curcellæus, and refuted by Heidegger, Danzius, Bockhart, &c. See ANTEDILUVIANS, § 9.

CARNO, a river of N. Wales in Montgomeryſh.

(1.) CARNOCK, a pariſh in the W. of Fifeſhire, about 3 miles ſquare. The ſoil is partly black earth, partly clay or till, and produces the uſual crops in conſiderable quantities. The air is damp in winter and ſpring. There are five coal mines, and 3 different ſpecies of ſtone in the pariſh; ſtones of two of theſe kinds have been dug up, 24 feet long, and 5 or 6 broad; and it is ſaid they might be raiſed of much larger dimenſions. The population in 1801, was 860, and had increaſed 277, in 37 years. Three miniſters of this pariſh have been depoſed or ejected, not for any immorality, but merely for matters of conſcience: viz. one in 1662, by archbiſhop Sharp, for refuſing to conform to epiſcopacy; another in 1689, for non-conformity to Preſbyterianiſm; and the 3d, viz. Mr GILLESPIE, in 1752, for refuſing to bear a part in a violent ſettlement. See RELIEF PRESBYTERY.

(2.) CARNOCK, a village in the above pariſh.

(3.) CARNOCK BURN, a rivulet in Carnock, N° 1.

CARNON, a town NW. of Columb, Cornwall.

CARNONBIGH, a town of Cornwall, between St Ive's Bay and the Land's End.

(1.) * CARNOSITY. *n. ſ.* [*carnoſité*, Fr.] Fleſhy excreſcence.—By this method, and by this courſe of diet, with ſudorificks, the ulcers are healed, and that *carnoſity* reſolved. *Wiſeman.*

(2.) CARNOSITY is uſed by ſome authors for a little tubercle, or wen, formed in the urethra, the neck of the bladder, or yard, which ſtops the paſſage of the urine. Carnoſities are very difficult of cure: they are not eaſily known but by introducing a probe into the paſſage, which there meets with reſiſtance. They uſually ariſe from ſome ill managed venereal malady.

CARNOTENA, or } a city of Gallia Celtica.
CARNOTENAS, } See AUTRICUM.

* CARNOUS. *adj.* [from *caro*, *carnis*, Lat.] Fleſhy.—The firſt or outward part is a thick and *carnous* covering, like that of a walnut; the ſecond, a dry and floſculous coat, commonly called mace. *Brown's Vulg. Err.*

CARNOUSE, *n. ſ.* in gunnery, the baſe ring on the breach of a gun.

CARNTEEL, a village in Tyrone, Ireland.

CARNUTÆ, a people of Gallia Celtica, who inhabited AUTRICUM and the territory around it.

(1.) CARNWATH, a pariſh of Scotland, in Lanarkſhire, 12 miles long from S. to N. and 8 broad. The ſoil is partly ſandy, partly deep rich clay. Turnip farming has been introduced with ſucceſs. Oats, barley, and potatoes are the chief produce. There is a conſiderable extent of muirland, on which great numbers of ſheep, horſes, and black cattle, are ſupported. The population in 1801, was 2680, and had increaſed 290 ſince 1755. There is an iron foundery in the pariſh.

(2.) CARNWATH, a village in the above pariſh, (N° 1.)

(N° 1.) in which there were 500 ſouls in 1793. It has fairs, 1ſt Thurſ. in July, and 2d Wedneſ. in Auguſt, O. S.

CARO, Annibal, a celebrated Italian poet, born at Civita Nuovo in 1507. He was ſecretary to the duke of Parma; afterwards to Cardinal Farneſe: and was made a knight of Malta. He tranſlated Virgil's Æneid into Italian with ſuch propriety, that he was allowed by the beſt judges to have equalled the original. He alſo tranſlated Ariſtotle's rhetoric, two oratorios of Gregory Nazianzen, and a diſcourſe of Cyprian. He wrote a comedy; and a miſcellany of his poems was printed at Venice in 1584. He died at Rome in 1566.

(1.) * CAROB, or *St John's Bread.* [*ſoliqua*, Lat.] A tree very common in Spain, and in ſome parts of Italy, where it produces a great quantity of long, flat, brown-coloured pods, which are thick, mealy, and of a ſweetiſh taſte. Theſe pods are eaten by the poorer inhabitants. *Miller.*

(2.) CAROB TREE. See CERATONIA.

CAROCHA, a name which the Spaniards and Portugueſe give to a mitre made of paſteboard, on which are painted flames and figures of dæmons, worn by thoſe who are condemned to death by the infernal tribunal of the INQUISITION. See ACT OF FAITH.

* CAROCHE. *n. ſ.* [from *caroſſe*, Fr.] A coach; a carriage of pleaſure. It is uſed in the comedy of *Albumazar*, but now it is obſolete.

CAROENON, [*καρονον*,] wine boiled down, till a third be evaporated.

* CAROL. *n. ſ.* [*carola*, Ital. from *choreola*, Lat.]

1. A ſong of joy and exultation.—

Oppos'd to her, on t'other ſide advance
The coſtly feaſt, the *carol*, and the dance,
Minſtrels and muſick, poetry and play,
And balls by night, and tournaments by day.
Dryden.

2. A ſong of devotion.—

They gladly thither haſte; and, by a choir
Of ſquadron'd angels, hear his *carol* ſung. *Milt.*

3. A ſong in general.—

The *carol* they began that hour,
How that life was but a flower. *Shakeſp.*

(1.) * *To* CAROL. *v. a.* [*carolare*, Ital.] To praiſe; to celebrate in ſong.—

She with precious viol'd liquours heals,
For which the ſhepherds at their feſtivals,
Carol their goodneſs loud in ruſtick lays. *Milt.*

(2.) * *To* CAROL. *v. n.* To ſing; to warble; to ſing in joy and feſtivity.—

Hark, how the cheerful birds do chant their lays,
And *carol* of love's praiſe. *Spenſer.*

CAROLA, *n. ſ.* in old records, a cloſet.

CAROLI, venereal excreſcences.

CAROLINA, an extenſive country of North America, originally comprehending the W. part of Florida, and lying between 29° and 36° 30′ Lat. N. It was bounded on the E. by the Atlantic, on the W. by the river Miſſiſippi, on the N. by Virginia, and on the S. of Georgia by the Floridas. It is ſeated between the extremities of heat and cold, though the heat is more troubleſome in ſummer than the cold in winter; the winters being very ſhort, and the froſty mornings frequently ſucceeded by warm days. The air is generally ſerene and clear the greateſt part of the year; but in February and March the inhabitants have a cuſtom of burning the woods, which cauſes ſuch a ſmoke as to ſtrangers would ſeem to proceed from a fog. It has great rains in winter, and often heavy ſhowers at midſummer. Weſterly winds bring very pleaſant weather; but the ſoutherly are hot and unwholeſome in ſummer, though in winter they are very comfortable. The depth of winter is towards the end of February, but even then the ice is not ſtrong enough to bear a man. In Aug. and Sept. there are ſometimes great winds, which are ſo violent as to make lanes of 100 feet wide, through the woods, tearing up the trees by the roots. Theſe ſtorms generally happen once in about ſeven years, and are attended with dreadful thunder, lightning, and heavy rains. They commonly happen about the time of the hurricanes which rage ſo fatally among the iſlands between the tropics; and ſeem to proceed from the ſame cauſe: but by the time they reach Carolina, their force is much abated. The ſoil on the coaſt is ſandy; but farther up, the country is ſo fruitful that they have not yet been at the trouble to manure their land. The grains moſt cultivated are Indian corn and rice; but any ſort will thrive. There are alſo pulſe of ſeveral ſorts, little known in England. All kinds of garden ſtuff uſual in Britain may be had in great plenty. Large quantities of rice, pitch, tar, turpentine, deer-ſkins, and timber for building; cypreſs, cedar, ſaſſafras, oak, walnut, and pine are annually exported: as well as beef, pork, tallow, hides, furs, wheat, peas, potatoes, honey, bees-wax, myrtle wax, tobacco, ſnake-root, cotton, and various gums and medicinal drugs. An inferior kind of indigo is alſo cultivated. The furs are bought of the Indians with vermillion, lead, gunpowder, coarſe cloth, iron, and ſpiritous liquors. Carolina is adorned with many beautiful rivers, and flouriſhing woods, which afford delightful ſeats for the planters, and render the fencing their lands very eaſy. And as they have plenty of fiſh, wild fowl, and veniſon, beſides other neceſſaries produced naturally, they live eaſy and luxuriouſly. The rivers are large, and navigable many miles up the country. They riſe near the mountains, and abound with delicate fiſh, beſides water fowl of different kinds. In ſome there are iſlands which yield good paſture without the annoyance of wild beaſts. The chief mountains are the APPALACHIAN. Carolina was diſcovered by Sebaſtian Cabot, about A. D. 1500, (ſee AMERICA, § 4, 10,) but the ſettling being neglected by the Engliſh, a colony of French Proteſtants, were tranſported thither; and named the place of their ſettlement *Arx Carolina*, in honour of that prince, Charles IX. of France: but in a ſhort time that colony was deſtroyed by the Spaniards; and no other attempt was made by any European power to ſettle there till 1664, when 800 Engliſh landed at Cape Fear, and took poſſeſſion of the country. In 1670, Charles II. of Britain granted Carolina to Lords Berkeley, Clarendon, Albemarle, Craven, and Aſhley, Sir George Carteret, Sir William Berkley, and Sir John Colliton. The plan of government for this new colony was drawn up by the famous Mr Locke, who very wiſely propoſed an univerſal toleration in religious matters. The only reſtriction was, that every perſon claiming the protection of that ſettlement, ſhould, at the age of 17, regiſter himſelf in ſome particular communion. That great philoſopher has been cenſured, however, by ſome, for not having been ſo favourable to civil liberty: But in this he ſeems to have been reſtricted by his employers, who having obtained a royal grant of the property, no doubt wiſhed to retain as much as poſſible of the power in their own hands. Accordingly the code of Carolina gave the 8 proprietors, and their heirs, not only all the rights of a monarch, but all the powers of legiſlation. This ſovereign body, called the *Palatine Court*, was inveſted with the right of nominating to all employments and dignities, and even of conferring nobility; but with new and unprecedented titles. They were, for inſtance, to create in each county two *caciques*, each of whom was to be poſſeſſed of 24,000 acres of land; and a *landgrave*, who was to have 80,000. The perſons on whom theſe honours ſhould be beſtowed were to compoſe the upper houſe, and their poſſeſſions were made unalienable. They had only the right of letting out a third part of them at the moſt for three lives. The lower houſe was compoſed of the deputies from the ſeveral counties and towns. The number of this repreſentative body was to be increaſed as the colony grew more populous. No tenant was to pay more than about 1 ſh. per acre, and even this rent was redeemable. All the inhabitants, however, both ſlaves and freemen, were under an obligation to take up arms upon the firſt order from the Palatine court. The defects of this conſtitution ſoon became apparent. The proprietary lords endeavoured to eſtabliſh an arbitrary government; and the coloniſts exerted themſelves with great zeal to avoid ſervitude. In conſequence of this ſtruggle, the whole province, diſtracted with tumults and diſſentions, became incapable of making any progreſs, though great things had been expected from its peculiar advantages of ſituation. Though a toleration in religious matters was part of the original conſtitution, diſſentions aroſe likewiſe on that account. In 1705, Carteret, now Lord Granville, who, as oldeſt proprietor, was ſole governor, formed a deſign of obliging all the non-conformiſts to embrace the ceremonies of the Church of England. This act of violence, though diſavowed by the mother country, inflamed the minds of the people. In 1720, while this animoſity was ſtill ſubſiſting, the province was attacked by ſeveral bands of ſavages, driven to deſpair by a continued courſe of the moſt attrocious violence and injuſtice. Theſe unfortunate wretches were all put to the ſword: but, in 1728, the lords proprietors having refuſed to contribute towards the expences of an expedition, of which they were to ſhare the immediate benefits, were all deprived of their prerogative, except Lord Granville. See AMERICA, § 10. The colony was taken under the immediate protection of the crown, and from that time began to flouriſh. The ſettlement of Georgia commenced in 1752, (ſee GEORGIA,) and the diviſion took place between NORTH and SOUTH CAROLINA, about three years earlier.

I. CAROLINA, NORTH, one of the United States of America, ſituated between 1° 1′. and 6° 35′ Lon. W.: and between 33° 51′. and 36° 30′ Lat. N. It is 450 miles long from E. to. W. and 180 broad from N. to S. being bounded on the N. by Virginia, on the E. and SE. by the Atlantic, on the S. by South Carolina, and on the W. by the new ſtate of Tennaſſee. This laſt was originally a part of North Carolina, but was given up to the United States in 1789, and ſince erected into a ſeparate ſtate. See TENNASSEE. North Carolina is divided into 8 diſtricts, viz. Edenton, Newbern, and Wilmington, which extend along the coaſt: and Halifax, Hillſborough, Saliſbury, Morgan, and Fayetteville, the greater part of which extend acroſs the ſtate from N. to S. Theſe diſtricts are ſubdivided into 54 counties, which will be deſcribed in their order. The chief rivers are the Chowan, Roanoke, Pamlico, Yadkin, Catabaw, Dan, Perquimams, Paſquotank, &c. The chief ſounds are Albemarle, Pamlico, and Core. The navigation of all the rivers is much obſtructed by ſand bars at their mouths, owing to the country being extremely level, for near 60 miles W. from the coaſt, and in its whole extent from N. to S. Between 60 and 70 miles however from the coaſt, it is mountainous. See AMERICA, § 42. But even on the hilly grounds, flax, hemp, tobacco, and grain are raiſed. The ground is ſo fertile that an induſtrious perſon, with one horſe, will raiſe 700 buſhels annually of Indian corn. Ground peaſe run along the ſurface of the earth, and are covered by hand with a light mould. The pods run under ground. They taſte like nuts, and are eaten raw or roaſted. Cotton is alſo raiſed in great plenty. The labour of one man produces 2000 lb. in the ſeeds, or 500 lb. fit for manufacturing, beſides as much proviſion as he can conſume. The country ſuits the breeding of ſheep, but their wool is neither good nor plentiful on the low lands, in the maritime diſtricts: a ſheep ſeldom producing 3 lb. and often leſs than one. But in the hilly and interior parts, the wool is excellent and the quantity abundant, ſheep producing from 5 to 9 lb. Black cattle are eaſily raiſed, requiring little proviſion in winter, and in ſummer nothing but a little ſalt occaſionally. Farmers often mark from 500 to 1000 calves in the ſeaſon and give hardly any farther attention to them till they are grown; when they are driven to Virginia, Maryland, or Pennſylvania, or ſlaughtered for exportation. Pork is alſo raiſed with little trouble. The hogs are allowed to roam at large in the woods, and grow fat on acorns and roots. In the maritime counties agues are frequent, the air being moiſt and ſultry; but in the weſtern it is elaſtic and ſalubrious. The moſt common trees are the oak, walnut, pine, hickory, and pitch pine; a tall majeſtic tree of which there are large foreſts, affording pitch, tar, turpentine, and different kinds of lumber, for exportation. A ſpecies of the ſenſitive plant, a kind of brier, is alſo found here, as well as the *Dionaea muſcipula*, or Venus's fly trap See DIONÆA. The climate is peculiarly favourable to the vine, wine being often made not inferior to port. Contrary to the aſſertion of ſome geographers, that the cultivation of the vine had been attempted in vain, Mr Scott aſſirms, in his *Unit. States Gaz.* that " a great variety of European grapes has been introduced by Mr Hawkins, late a ſenator in Congreſs, and others;" and that "they ſucceed well, and are likely ſoon to become profitable." A ſpecies of rock, ſuppoſed to be a concretion of marine ſhells, ſupplies the want of lime-ſtone, and the ſtate abounds with iron ore. The annual exports amounted, on the 30th Sept. 1791, to 524,548 dollars. The population in 1791, was 393,751; of whom, 100,572 were ſlaves; and in 1801, it was 478,103, including 133,296 ſlaves. In 1710, the number of inhabitants did no exceed 6000. Mr Morſe accounts for this rapid increaſe from the eaſe with which a family can be maintained, and the conſequent very early marriages of the natives. He adds, "we have heard of *grand-mothers* in this ſtate not more than 27 years old." The north Carolinians are moſtly planters, and have little intercourſe with ſtrangers, but have a natural fondneſs for ſociety, which renders them hoſpitable to travellers. "They have little taſte (ſays Morſe) for the ſciences. Temperance and induſtry are not among their virtues. The time they waſte in drinking, idling, and gambling leaves them little opportunity to improve their plantations, or their minds,—though they have a productive country, and are not deſtitute of genius." But after narrating a barbarous practice, that prevailed much among boxers, called GOUGING, (*i. e* putting out the eye of an antagoniſt with the thumb), he adds, "How quick, under a mild government, is the reformation of manners!—In a particular county, where, at the quarterly court 20 years ago, a day ſeldom paſſed without 15 or 20 boxing matches, it is now rare to hear of a fight;—and, during the revolution, this ſtate produced many diſtinguiſhed patriots and ſtateſmen, and ſent thouſands to the defence of Georgia, South Carolina, and Virginia. In the maritime diſtricts, the prevailing religious ſects are the Epiſcopalians and Methodiſts; but in the weſtern, the Preſbyterians and Moravians are moſt numerous. Quakers and Baptiſts are alſo interſpered through the ſtate. The legiſlative authority, eſtabliſhed in 1776, is veſted in a ſenate and houſe of commons; which are jointly called the *General Aſſembly*. Both are annually elected by ballot: each county chooſing one ſenntor and two commoners; and each of the towns of Edenton, Wilmington, Newbern, Saliſbury, Hillſborough, Halifax, and Fayetteville, one commoner. The qualifications for a ſenator are one year's reſidence and 300 acres of land in fee ſimple; of a commoner a like reſidence and 100 acres. Thoſe for a voter are 21 years of age, a year's reſidence and having paid taxes; and in addition to theſe, a voter for a ſenator muſt have a freehold of 50 acres. The governor is choſen by the legiſlature annually, and is only eligible 3 years in 6. He muſt be 30 years of age, 5 years reſident, and poſſeſs a freehold of L. 1000. A council of ſtate, conſiſting of 7 members, is alſo choſen to aſſiſt him, by the legiſlature; who likewiſe appoint the judges and attorney general; the treaſurer annually; the ſecretary triennially, and the militia officers during pleaſure. They alſo recommend fit perſons for juſtices of peace. All perſons in public offices, and all who deny the being of a God, are excluded from ſitting in either houſe. Newbern is the largeſt town of North Carolina, and was formerly the reſidence of the governor: Each of the other ſix above mentioned, however, had their turns as the ſeat of the general aſſembly, till lately that Raleigh, ſituate near the centre of the ſtate, has been eſtabliſhed as the metropolis. In 1789, the general aſſembly paſſed a law, incorporating forty gentlemen, 5 from each diſtrict, as truſtees of the univerſity of North Carolina; to whom in Dec. 1791, they granted a loan of 5000l. to enable them to proceed with their buildings. There is a very good academy at Warenton, another at Williamſborough, in Granville, and ſeveral others of conſiderable note, in different towns in the ſtate.

II. **Carolina, South** one of the United States of America, ſituated between 3° 34′ and 90° 20′ Lon. W. and between 32° and 35° Lat. N. and comprehending an extent of 20,000 ſquare miles; being 200 miles long and 125 broad. Mr Scott makes its length 270 miles. It lies ſomewhat in the form of a triangle, whoſe baſe extends along the Savannah 250 miles. The ſea coaſt from Little river to the mouth of the Savannah is 173 miles, and the ſide adjoining North Carolina from Little river to the W. extremity is 270 m. It is bounded on the N. and NE. by N. Carolina; on the N. W. and W. by the new ſtate of Tenaſſee; on the S. and SW. by the river Savannah, on the SE. and and E. by the Atlantic ocean. The Tugulo ſeparates it from Georgia. It is divded into 9 diſtricts; viz. Beaufort, Charleſton, Orangeburgh, Camden, Georgetown, Ninety-Six, Cheraws, Pinckney, and Waſhington; which are ſubdivided into 38 counties. The chief rivers, are the Santee, Ediſto, Wateree, Wakkamaw, Aſhley, Aiheppo, Black, Cooper, &c. A canal of 21 miles in length, connecting Cooper and Santee rivers, was nearly completed, in 1801, which was eſtimated to coſt 40,000 dollars; and another was propoſed, to unite the Ediſto with the Aſhley. The country is level for 80 miles NW. from the coaſt, but afterwards riſes gradually for 60 miles in ſand hillocks. Beyond this the country it agreerbly diverſified with hills dales, and woods, till at the diſtance of 220 miles, it is 800 feet above the ſea level. The ſoil is various, and the productions much the ſame as thoſe of North Carolina. Bones of enormous ſize, ſuppoſed to have belonged to the **Mammuth**, were found in cutting for the canal. In the upper counties there are few ſlaves, the farmers depending chiefly on their own induſtry. They even manufacture their own cloathing, and moſt of their implements of huſbandry; whereas on the coaſt and for 50 miles back every thing is done by ſlaves. So much attention is paid to the manufacture of indigo, that it bids fair to rival that of the French. The exports in 1791, amounted to 1,693,267 dollars, and in 1795 to 5,998,492 dollars. The population by the Cenſus, in 1801, was 345,591, of whom 145,151 were ſlaves. The legiſlative authority, by the conſtitution ratified in 1790, was veſted in a general aſſembly, conſiſting of a ſenate and houſe of repreſentatives. Of the former there are 37; of the latter 124, elected among the diſtricts. The ſenators are elected for 4 years, and divided into two claſſes; one claſs to be choſen every 2d year.

They muſt be free white men, 30 years old, and 5 years reſident in the ſtate. If reſiding in the diſtrict, they muſt poſſeſs a clear freehold of L. 300; if non-reſident, one worth L. 1000. The repreſentatives are elected for 2 years; muſt be free white men 21 years old, and 3 years reſident in the ſtate. If reſiding in the diſtrict, they muſt poſſeſs 500 acres, and *ten negroes*, or a clear eſtate worth L 150. Voters for either branch muſt be free, white men, 21 years old, 2 years reſident in the ſtate, poſſeſs a freehold of 50 acres; or a town lot; or have reſided 6 months in the diſtrict; and paid a tax of 3 ſh. The general election is held every 2d year on the 2d Monday of October, and the general aſſembly meet annually on the 4th Tueſday of November. The executive authority is lodged in a governor choſen for 2 years by the legiſlature, but not eligible again till after 4 years. He muſt be 31 years old; 10 years reſident, and have a clear eſtate of L. 1,500. The lieutenant-governor and judges are alſo choſen by the legiſlature, during good behaviour, and have ſalaries. The commiſſioners of the treaſury, ſecretary of ſtate. ſheriffs, &c. are elected for 4 years. The legiſlature has power to amend the conſtitution. Charleſton which was formerly the capital of all Carolina before the diviſion, is ſtill reckoned the chief town; but Columbia is the ſeat of government. The public offices have, however, in ſome meaſure been divided, for the accommodation of the inhabitants of the Lower counties, and a branch of each retained in Charleſton. There are ſeveral reſpectable academies in Charleſton, one at Beaufort, on Port Royal iſland, and ſeveral others in different parts of the ſtate. Three colleges have lately been incorporated by law; one at Charleſton, one at Winnſborough, in the diſtrict of Camden, and the other at Cambridge, in the diſtrict of Ninety-ſix. The legiſlature, in their ſeſſion in January 1795, appointed a committee to enquire into the practicability of, and to report a plan for, the eſtabliſhment of ſchools in different parts of the ſtate. "The inhabitants (ſays Morſe) have no peculiarity of manners, except what ariſes from the miſchievous influence of ſlavery." They are affable, hoſpitable, polite, and attentive to ſtrangers. The ladies have an engaging ſoftneſs and delicacy in their manners. The CATABAWS are the only Indian nation in this ſtate. The preſbyterians are the moſt numerous religious ſect.

(III.) CAROLINA, a town of Spain, in Andaluſia; the chief town of a colony of the ſame name, in the Sierra Morena. It ſtands on a hill, towering above the whole ſettlements, 20 miles NE. of Anduxar.

(1.) CAROLINE, a fertile county of the United States in Maryland, in the Eaſtern Shore, bounded on the N. and NW. by Queen Anne's county, on the S. by Dorcheſter, on the W. by Tuckahoe creek and part of Choptank river, and on the E. by the ſtate of Delaware. It is 54½ miles from N. to S. and 16 from E. to W.; and in 1795 contained 7,449 free inhabitants, and 2057 ſlaves. It is well watered by the Choptank, and the Tuckahoe and Marſhy-Hope creeks. Denton is the chief town.

(2.) CAROLINE, a populous and well cultivated county in Virginia; bounded on the SE. by Eſſex and King William counties; on the SW. by Hanover; on the NW. by Spottſylvania, and on the NE. by the Rappahannock. It is 40 miles long, and equally broad; and in 1795 contained 7,197 free inhabitants, and 10,292 ſlaves!

(3.) CAROLINE. See CARLINE, N° 1.

(4.) CAROLINE BOOKS, 4 books compoſed by order of Charlemagne, to refute the 2d council of Nice, with regard to the worſhip of images. They contain 120 heads of accuſation againſt that council, drawn up by the biſhops of France, and firſt publiſhed in 1549, by M. du Tillet, biſhop of Meaux, under the title of *Elia Phylira*.

(5.) CAROLINE THISTLE. See CARLINA. It is pretended to have been diſcovered by an angel to Charlemagne, to cure his army of the plague; whence it took its name.

CAROLINEA, in botany, a genus of the polyandria order belonging to the monadelphia claſs of plants.

CAROLINIANS, the inhabitants of the ſtates of N. and S. Carolina.

CAROLOSTADIANS, or CARLOSTADIANS, an ancient ſect of Lutherans, who denied the real preſence of Chriſt in the Euchariſt; thus denominated from their leader CAROLOSTADIUS. They are the ſame with the SACRAMENTARIANS, and agree in moſt things with the ZUINGLIANS.

CAROLOSTADIUS, Andrew, archdeacon of Wittemberg, was converted by Luther, and was the firſt of all the reformed clergy who took a wife; but diſagreeing afterwards with Luther, chiefly in the point of the ſacrament, founded a ſect apart.

(1.) CAROLUS, an ancient Engliſh gold coin, broad and thin, ſtruck under Charles I. Its value has of late been at 23ſh. though at the time it was coined it was rated at 20.

(2.) CAROLUS, a ſmall copper coin, mixed with a little ſilver, ſtruck under Charles VIII. of France. It was worth 12 deniers, when it ceaſed to be current. Thoſe which are ſtill current in ſome places go under the name of French ſols.

CAROPI, in botany, a name given by the inhabitants of the Philippine iſlands to a plant greatly eſteemed by the natives, and ſuppoſed by Camelli to be the true *amomum* of the Greeks. See AMOMUM VERUM.

CARORA, a town of Terra Firma, on Lake Maracaybo, 110 miles NE. of Gibraltar.

CARROSSA, a conſiderable town of Italy, in the late Italian republic, and dep. of the Adda, ſituated on the Po, oppoſite Piacenza, where Gen. Buonaparte paſſed the Po with his army, almoſt without reſiſtance, on the 7th May, 1796.

CAROTEEL, in commerce, a certain weight or quantity of divers kinds of goods; *ex. gr.* of cloves from 4 to 500 weight; of currants, from 5 to 900; of mace, about 300 weight; and of nutmegs, from 6 to 7½ cwt.

(1.) * CAROTID. *adj.* [*carotides*, Lat.] Two arteries which ariſe out of the aſcending trunk of the aorta, near where the ſubclavian arteries ariſe.—The *carotid*, vertebral, and ſplenick arteries, are not only variouſly contorted, but alſo here and there dilated, to moderate the motion of the blood. *Ray on the Creation.*

(2.) CAROTIDS. See ANATOMY; *Index*.

CAROUGE POINT, the N. extremity of Hiſpaniola, 25 miles N. of St Jago.

* CAROUSAL. *n. ſ.* [from *carouſe*. It ſeems more properly pronounced with the accent upon the ſecond ſyllable; but *Dryden* accents it on the firſt.] A feſtival.—

This game, theſe *carouſals* Aſcanius taught,
And building Alba to the Latins brought.
Dryden.

* CAROUSE. *n. ſ.* [from the verb.] 1. A drinking match.—

Waſte in wild riot what your land allows,
There ply the early feaſt, and late *carouſe*. *Pope.*

2. A hearty doſe of liquor.—He had ſo many eyes watching over him, as he could not drink a full *carouſe* of ſack; but the ſtate was advertiſed thereof within a few hours after. *Davies on Ireland.*

(1.) * *To* CAROUSE. *v. a.* [*carouſſer*, Fr. from *garouſz*, all out, Germ.] To drink up laviſhly.—

Our cheerful gueſts *carouſe* the ſparkling tears
Of the rich grape, whilſt muſick charms their ears. *Denham.*

(2.) * *To* CAROUSE. *v. n.* To drink; to quaff; to drink largely.—

He calls for wine: a health, quoth he, as if
H'ad been aboard *carouſing* to his mates
After a ſtorm. *Shakeſpeare.*

* CAROUSER. *n. ſ.* [from *carouſe*.] A drinker; a toper.—

The bold *carouſer* and advent'ring dame,
Nor fear the fever, nor refuſe the flame;
Safe in his ſkill from all conſtraint ſet free,
But conſcious ſhame, remorſe, and piety.
Granville.

CAROXYLON, in botany, a genus of the monogynia order, belonging to the pentandria claſs of plants, in the Linnæan ſyſtem.

(1.) * CARP. *n. ſ.* [*carpt*, Fr.] A pond fiſh.—A friend of mine ſtored a pond of 3 or 4 acres with *carps* and tench. *Hale's Origin of Mankind.*

(2.) CARP, in ichthyology. See CYPRINUS, and FISHING. The carp is the moſt valuable of all fiſh for ſtocking of ponds. It is very quick in its growth, and ſpans 3 or 4 times a-year. The female does not begin to breed till 8 or 9 years old; ſo that in breeding ponds a ſupply muſt be kept of carp of that age. In ſtocking a breeding pond, 1 male ſhould be allowed to 4 females. The uſual growth of a carp is 2 or 3 inches in length in a year; but, in ponds which receive the fattening of common ſewers, they have been known to grow from 5 inches to 18 in one year. A pond of 1 acre will feed 1000 carp; viz. 300 of 3 years old, 300 of 2 years, and 400 of one year old. Carp delight in ponds that have marley ſides; and in clay ponds well ſheltered from the winds, with weeds and long graſs at the edges, which they feed on in the hot months. Carp and tench thrive very faſt in ponds and rivers near the ſea, where the water is a little brackiſh; but they are not ſo well taſted as thoſe which live in freſh water. Grains, blood, chicken-guts, and the like, may at times be thrown into carp ponds, to fatten the fiſh. The growth of graſs under the water ſhould alſo by all means poſſible be encouraged. For this purpoſe, as the water decreaſes in the ſummer, the ſides of the pond left dry ſhould be well raked with an iron rake, to deſtroy all the weeds, and cut up the ſurface of the earth: hay-ſeed ſhould then be ſown plentifully in theſe places; and more ground prepared in the ſame manner, as the water decreaſes. Thus there will be a plentiful growth of young graſs along the ſides of the pond, which, when the rains fill it up again, will be all under the water, and the fiſh will come and fatten greatly upon it.

* *To* CARP. *v. n.* [*carpo*, Lat.] To cenſure; to cavil; to find fault: with *at* before the thing or perſon cenſured.—Tertullian, even often through diſcontentment, *carpeth* injuriouſly *at* them, as though they did it even when they were free from ſuch meaning. *Hooker.*—

No, not a tooth or nail to ſcratch
And *at* my actions *carp* or catch. *Herbert.*

CARPÆA, [καρπαια,] a kind of dance anciently in uſe among the Athenians and Magneſians, performed by two perſons, the one a labourer, the other acting as a robber. The labourer laying by his arms, went to ploughing and ſowing, ſtill looking warily about him as afraid of being ſurpriſed: the robber at length appeared, and the labourer quitting his plough, betook himſelf to his arms, and fought in defence of his oxen. The whole was performed to the ſound of flutes, and in cadence. Sometimes the robber was overcome, and ſometimes the labourer; the victor's reward being the oxen and plough. The deſign of the exerciſe was to teach and accuſtom the peaſants to defend themſelves againſt the attacks of ruffians.

CARPASUS, in ancient geography, a town in Cyprus, famous for making incombuſtible cloth of the aſbeſtos ſtone.

CARPATES, or the } See BASTARNICÆ ALPES.
CARPATHIAN MOUNTAINS. }
CARPATHIAN SEA, } the ſea that waſhes
CARPATHIUM MARE, } the coaſt of CARPATHUS.

CARPATHUS, an iſland on the coaſt of Aſia, 200 ſtadia or furlongs in compaſs, and 100 in length. Its name is ſaid to be from its ſituation on the coaſt of Caria. It lies between Rhodes and Crete, in the Carpathian Sea, and has the Ionian on the N. the Egyptian on the S. and the Cretan and African ſeas on the W. It had anciently, according to Strabo, 4 cities; according to Scylax, only 3. Ptolemy mentions but 1, which he calls POSIDIUM. This iſland is now called SCARPANTO.

CARPENDOLO, a town of Italy, in the Veroneſe, included in the late Italian republic, and dep. of the Mella. A battle was fought at this place in January 1797, between the French and Auſtrians, wherein the republicans under Gen. Menard were victorious, and took 900 priſoners. The town contains 4000 citizens, and is ſituated on the Mieſe.

CARPENTARIA, in botany. See LEPIDIUM.

CARPENTARIUS, in antiquity, a maker of carriages; whence ſome derive the word, *carpenter*.

(1.) * CARPENTER. *n. ſ.* [*carpentier*, Fr.] An artificer in wood; a builder of houſes and ſhips. He is diſtinguiſhed from a joiner, as the carpenter performs larger and ſtronger work.—In building Hiero's great ſhip, there were 300 *carpenters* employed for a year together. *Wilkins.*

(2.) CARPENTER OF A SHIP, an officer appointed

pointed to examine and keep in order the frame of a ſhip, together with her maſts, yards, boats, and all other wooden machinery. It is his duty in particular to keep the ſhip *tight;* to review the decks and ſides, and to caulk them when it is neceſſary. In the time of battle, he is to examine, with all poſſible attention, the lower apartments of the ſhip, to ſtop any holes that may have been made by ſhot, with wooden plugs provided of ſeveral ſizes.

CARPENTRAS, a town of France, in the ci-devant province of Provence, and capital of Venaiſſin. Before the revolution, it was ſubject to the pope, but is now included in the department of Vaucluſe. It is ſeated on the river Auſon, at the foot of a mountain; 14 miles NE. of Avignon. Lon. 5. 6. E. Lat. 44. 8. N.

(1.) * CARPENTRY. *n. ſ.* [from *capenter.*] The trade or art of a carpenter.—It had been more proper for me to have introduced *carpentry* before joinery, becauſe neceſſity did doubtleſs compel our forefathers to uſe the conveniency of the firſt, rather than the extravagancy of the laſt. *Moxon.*

(2.) Carpentry, the art of cutting, framing, and joining large pieces of wood, for the uſes of building. It is one of the arts ſubſervient to architecture, and is divided into houſe carpentry and ſhip carpentry: the firſt is employed in raiſing, roofing, flooring of houſes, &c. and the ſecond in the building of ſhips, barges, &c. See Ship-building. The rules in carpentry are much the ſame with thoſe of Joinery; the only difference is, that carpentry is uſed in the larger and coarſer work, and joinery in the ſmall and curious.

CARPENTUM, in antiquity, a name common to divers ſorts of vehicles, anſwering to coaches, waggons, carts, &c. among us. The carpentum was originally a kind of car in which the Roman ladies were carried; though in after times it was alſo uſed in war. Some derive the word from *carras;* others from Carmenta, by a converſion of the *m* into *p.*

* CARPER. *n. ſ.* [from *To carp.*] A caviller; a cenſorious man.—

I have not theſe weeds,
By putting on the cunning of a *carper.* *Shakeſ.*

CARPERBY, a town near Aſkrig, Yorkſhire.

CARPESIUM, in botany, a genus of the order polygamia ſuperflua, belonging to the ſyngeneſia claſs of plants; and ranking, according to the natural method, in the 49th order, Compoſitæ.

(1.) * CARPET. *n. ſ.* [*karpet,* Dutch.] 1. A covering of various colours, ſpread upon floors or tables.—Be the Jacks fair within, the Jills fair without, *carpets* laid, and every thing in order? *Shakeſpeare.*—Againſt the wall, in the middle of the half pace, is a chair placed before him, with a table and *carpet* before it. *Bacon.* 2. Ground variegated with flowers, and level and ſmooth.—

Go ſignify as much, while here we march
Upon the graſſy *carpet* of this plain. *Shakeſpeare.*

3. Any thing variegated.—The whole dry land is, for the moſt part, covered over with a lovely *carpet* of green graſs, and other herbe. *Ray.* 4. *Carpet* is uſed, proverbially, for a ſtate of eaſe and luxury: as, a *carpet* knight, a knight that has never known the field, and has recommended himſelf only at table.—He is knight, dubbed with unhacked rapier, and on *carpet* conſideration. *Shakeſpeare.* 5. To be on the *carpet,* [*ſur le tapis,* Fr.] is to be the ſubject of conſideration; an affair in hand.

(2.) Carpet knights, a denomination given to gown-men and others, of peacable profeſſions, who, on account of their birth, office, or merits, are raiſed to the honour of knighthood. They are ſo named, becauſe they uſually receive their honours from the king, in the court, kneeling on a carpet; by which they are diſtinguiſhed from knights created in the camp, or field of battle. Carpet knights are a medium between *truck,* or *dunghill knights,* who only purchaſe or merit the honour by their wealth, and *knights bachelors,* who are created for their ſervices in war.

(3.) Carpets are either wrought with the needle or in a loom. Perſian and Turkey carpets are moſt eſteemed; though at Paris there is a manufactory after the manner of Perſia, where they make them little inferior, not to ſay finer than the true Perſian carpets. They are velvety, and perfectly imitate the carpets which come from the Levant. There are alſo carpets of Germany, ſome of which are made of woollen ſtuffs, as ſerges, &c. and called ſquare carpets; others are made of wool alſo, but wrought with the needle, and pretty often embelliſhed with ſilk; and, laſtly, there are ſome made of dogs hair. We have likewiſe carpets made in Britain, which are uſed either as floor carpets, or to cover chairs, &c. And if the Britiſh have not yet arrived at the like perfection in this manufacture with their neighbours the French, they have of late years made great improvements in their carpet manufactories, which are daily producing new and beautiful patterns.

* *To* Carpet. *v. a.* [from the noun.] To ſpread with carpets.—We found him in a fair chamber, richly hanged and *carpeted* under foot, without any degrees to the ſtate; he was ſet upon a low throne, richly adorned, and a rich cloth of ſtate over his head, of blue ſattin embroidered. *Bacon.*—The dry land we find every where naturally *carpeted* over with graſs, and other agreeable wholeſome plants. *Derham.*

Carp fishing. See Fishing.

CARPHEOTUM, white frankincenſe.

(1.) CARPI, a ci-devant principality of Modena, about 4 leagues from that city, included in the late Italian republic and dep. of the Croſtolo. It formerly belonged to the houſe of Pio. In the beginning of the 14th century, Manfroy was the firſt prince of Carpi; but in the 16th, the emperor Charles V. gave it to Alfonzo duke of Ferrara.

(2.) Carpi, the capital of the above diſtrict, is ſituated on the Sochia. It has a ſtrong caſtle, and lies 12 miles N. of Modena. Lon. 11. 12. E. Lat. 11. 45. N.

(3.) Carpi, a town of Italy, in the Veroneſe, included in the late republic, and dep. of Benaco; memorable for a victory gained by the Imperialiſts over the French, in 1701. It is ſituated on the Adige, 27 miles S. of Verona. Lon. 11. 39. E. Lat. 45. 10. N.

(4.) **Carpi**, Girolamo da, hiſtory and portrait painter, born at Ferrara, in 1501, and a diſciple of Garofalo. He acquired ſuch an excellence in the imitation of Corregio's ſtyle, that many paintings copied by him were taken for originals, and eagerly purchaſed by the connoiſſeurs. Nor is it improbable, that ſeveral of his paintings paſs at this day for the genuine works of Corregio. He died in 1556.

(5.) **Carpi**, Ugo da, an Italian painter, remarkable for being the inventor of that ſpecies of engraving on wood, diſtinguiſhed by the name of chiaro ſcuro, in imitation of drawing. This is performed by uſing more blocks than one; and Ugo da Carpi uſually had three; the firſt of the outline and dark ſhadows, the ſecond for the lighter, and the third for the half tint. In that manner he ſtruck off prints after ſeveral deſigns, and cartons of Raphael; particularly one of the Sybil, a deſcent from the croſs, and the hiſtory of Simon the Sorcerer. He died in 1500.

CARPIA, a tent put into a wound.

* CARPING. *particip. adj.* [from *To carp.*] Captious; cenſorious—

No *carping* critick interrupts his praiſe,
No rival ſtrives but for a ſecond place: *Granv.*

—Lay aſide therefore a *carping* ſpirit, and read even an adverſary with an honeſt deſign to find out his true meaning; do not ſnatch at little lapſes, and appearances of miſtake. *Watts.*

* CARPINGLY. *adv.* [from *carping.*] Captiouſly; cenſoriouſly.—We derive out of the Latin at ſecond hand by the French, and make good Engliſh, as in theſe adverbs, *carpingly*, currently, actively, colourably. *Camden's Remains.*

(I.) CARPINUS, the horn-beam, in botany: a genus of the polyandria order, belonging to the monœcia claſs of plants; and in the natural method ranking under the 50th order, *Amentaceæ.* The calyx of the male is monophyllous and ciliated; there is no corolla, but 20 ſtamina. The calyx of the female is monophyllous and ciliated; no corolla; two germens, with two ſtyles on each. The fruit is an egg-ſhaped nut. There are two ſpecies, viz.

1. **Carpinus betulus**, or common horn-beam; a deciduous tree, native of Europe and America. Its leaves are of a darkiſh green, and about the ſize of thoſe of the beech, but more pointed and deeply ſerrated. Its branches are long, flexible, and crooked; yet, in their general appearance reſemble thoſe of the beech. Indeed there is ſo great a likeneſs between theſe two trees, eſpecially in their ſhrubby and underwood ſtate, that it would be difficult to diſtinguiſh them, were it not for the gloſſy varniſh with which the leaves of the beech are ſtrongly marked. In the days of Evelyn, when topiary work was the gardener's idol, the horn-beam might be deſerving of thoſe endearing expreſſions which that enthuſiaſtic writer has laviſhed upon it; as an ornamental in modern gardening it ſtands low; and its preſent uſes are few. As an underwood, it affords ſtakes and elders, fuel and charcoal. Its timber ranks with that of the beech and the ſycamore; and the inner bark is ſaid to be much uſed in Scandinavia to dye yellow. The only ſuperior excellency of the horn-beam lies in its fitneſs for ſheltering gardens, nurſeries, and young plantations in winter. It may be trained up to almoſt any height, and by keeping it trimmed on the ſides it becomes thick of branches and leaves; which being retained after they wither, a horn-beam hedge occaſions a degree of ſhelter nearly equal to that given by a brick wall. Indeed, being leſs reflective, it affords a more uniform temperature to the plants which ſtand near it. In this view, too, the horn-beam is uſeful to be planted in alternate rows, amongſt tender plants in expoſed ſituations, in the ſame manner as the birch; to which it has more than one preference; being warm in winter, and peculiarly grateful to the hares and rabbits, which may prevent their injuring its more valuable neighbours. Of theſe ſpecies there are 3 varieties, viz. the Eaſtern, the Flowering, and the American Horn-beam. The eaſtern horn-beam arrives to the height of about ten feet, and looks pretty enough with trees of the ſame growth. The leaves are not ſo large as thoſe of the common ſort; and as the branches are always cloſer in proportion to the ſmallneſs of the leaves, it is a proper tree where a low hedge is wanted of the deciduous kind, either to be ſheered, or ſuffered to grow in its natural ſtate. The bark is more ſpotted than that of the common. The flowering horn-beam is the moſt free ſhooter of any, and will arrive to be the higheſt, the common horn-beam only excepted. It will grow to be 30 or 40 feet high. The branches are leſs ſpotted with greyiſh ſpots than any of the others. The leaves are very rough, of a dark green colour, and are longer than the common ſort. The leaves of this variety conſtantly fall off in autumn. American horn-beam is a more elegant tree than any of the former. The branches are ſlender, covered with a browniſh ſpeckled bark, and are more ſparingly ſent forth than from any of the others. The leaves are oblong, pointed, and of a paliſh green, and are not nearly ſo rough as the common horn-beam, though the flowers and fruit are produced in the ſame manner.

2. **Carpinus ostrya**, the hop horn-beam, a native of Italy and of Virginia. This is of taller growth than the eaſtern kind. It will arrive to the height of 20 feet, or more. The leaves are nearly the ſize of the common ſort, and ſome admire this tree on account of the ſingular appearance it makes with its ſeeds, before they begin to fall. There is a variety which grows to 30 feet high, ſhoots freely, has long rough leaves like thoſe of the elm, and longiſh yellow coloured flowers, called the *Virginian flowering hop horn-beam.*

(II.) **Carpinus, propagation of the different kinds of.** The common horn-beam may be propagated either by layering (at almoſt any time of the year,) or from ſeeds in the following manner: In the autumn the ſeeds will be ripe; when, having gathered a ſufficient quantity for the purpoſe, let them be ſpread upon a mat a few days to dry. After this, they ſhould be ſown in the ſeminary ground, in beds 4 feet wide, with an alley of about two feet, and from one to two inches deep. In this bed they muſt remain till the ſecond ſpring before they make their appearance; and in ſummer, while they lie concealed, the weeds ſhould be plucked up as ſoon as they peep; for if neglected, the fibres of their roots will be ſo far ſtruck down among the ſeeds, as to endanger the drawing many ſeeds out with them, on weeding the ground. After the young plants appear, they ſhould be kept clear of weeds during the next ſummer; and now and then refreſhed with water in dry weather. In the ſpring following they may be taken out of theſe beds, and planted in the nurſery, where they may remain till they are ready to plant out for ſtandards. The other ſorts are to be propagated by layers; for which purpoſe a few plants for ſtools muſt be procured. The ſtools of the eaſtern horn-beam ſhould be planted a yard, and the other ſorts 1½ or two yards aſunder. After they have made ſome young ſhoots, they ſhould be layered in the autumn, and by that time twelvemonth they will have ſtruck root; at which time, or in winter, or early in the ſpring, they ſhould be taken off, and planted in the nurſery way, obſerving always to bruſh up the ſtool, that it may afford fine young ſhoots for freſh layering by the autumn following. The diſtance of the plants in the nurſery need be no more than one foot, in rows two feet aſunder. They may ſtand, with the uſual nurſery care of weeding and digging the rows in winter, until they are to be finally planted out; though the Virginian horn-beam will frequently ſend forth two ſhoots, which will ſeem to ſtrive for maſtery in the lead. Of theſe, the weakeſt ſhould always be taken away, otherwiſe the tree will grow forked.

CARPIO, a town of Spain, in Andaluſia.

CARPMANSEL, a village in Lincolnſhire, ſeated on the Winſter.

* CARPMEALS. *n. ſ.* A kind of coarſe cloth made in the North of England. *Philips's World of Words.*

CARPOBALSAM, [from καρπος, fruit, and βαλσαμος, balſam,] in the materia medica, the fruit of the tree, which yields the true oriental balſam. It is uſed in Egypt, in all the intentions in which the balſam itſelf is applied. The only uſe the Europeans make of it is in Venice treacle and mithridate; and in theſe not a great deal, for cubebs and juniper berries are generally ſubſtituted in its place.

CARPOBOLUS. See LYCOPERDON.

CARPOCRATES, a heretic of the 2d century, who revived and added to the errors of Simon Magus, Menander, Saturninus, and other Gnoſtics. He owned, with them, one ſole principle and father of all things, whoſe name as well as nature was unknown. The world, he taught, was created by angels, vaſtly inferior to the firſt principle. He oppoſed the divinity of Jeſus Chriſt; making him a mere man, begotten of Mary by Joſeph, though poſſeſſed of uncommon gifts which ſet him above other creatures. He inculcated a community of women; and taught, that the ſoul could not be purified, till it had committed all kinds of abominations, making that a neceſſary condition of perfection.

CARPOCRATIANS, a branch of the ancient Gnoſtics, ſo called from CARPOCRATES.

CARPOLITHI, or FRUIT-STONE ROCKS of the Germans, are compoſed of a kind of jaſper, of the nature of the AMYGDALOIDES, or almond ſtones. Bertrand aſſerts that the latter appear to be compoſed of elliptical pieces like petrified almonds, though in truth they are only ſmall oblong pieces of calcareous ſtone rounded by attrition, and ſometimes ſmall muſcle ſhells connected by a ſtony concretion. The name *carpolithi*, however, is given in general by writers on foſſils to all ſtony concretions that reſemble fruit of any kind.

CARPOS, [Καρπος,] fruit. The old Greek writers did not keep ſtrictly to the ſenſe of the word, but often expreſſed by it the eſculent part of a plant, in general.

(1.) * CARPUS. *n. ſ.* [Lat.] The wriſt, ſo named by anatomiſts, which is made up of 8 little bones, of different figures and thickneſs, placed in two ranks, four in each rank. They are ſtrongly tied together by the ligaments which come from the radius, and by the annulary ligament. *Quincy.* —I found one of the bones of the *carpus* lying looſe in the wound. *Wiſeman's Surgery.*

(2.) CARPUS. See ANATOMY, § 153.

CARR, a kind of rolling throne, uſed in triumphs, and at the ſplendid entries of princes. See CAR, and CHARIOT. The word is originally Gauliſh, or Celtic, and is called by Cæſar, in his Commentaries, *Carrus*. Plutarch relates, that Camillus having entered Rome in triumph, mounted on a carr drawn by 4 white horſes, it was looked on as too haughty an innovation. CARR is alſo uſed for a kind of light open chariot. The carr, on medals, drawn either by horſes, lions, or elephants, uſually ſignifies either a triumph or an apotheoſis; ſometimes a proceſſion of the images of the gods at a ſolemn ſupplication, and ſometimes of thoſe of ſome illuſtrious family at a funeral. The carr covered, and drawn by mules, only ſignifies a conſecration, and the honour done any one of having his images carried at the games of the circus. See CONSECRATION.

(1.) CARRA, a river of Ireland, in Kerry.

(2.) CARRA, John Lewis, a noted actor in the French revolution, was born at Pont de Veſles in 1743, and bred to the law, but quitted that profeſſion in purſuit of letters. Previous to the breaking out of the revolution, he travelled as far as Moldavia, and there became ſecretary to the hoſpodar. Returning to France about the beginning of the political ferment, his mind was quickly leavened, and he became the publiſher of a journal, entitled *Les Annales Politiques et Litteraires*, which was widely circulated, and eagerly ſought after; and there is little doubt than this paper contributed largely to inflame the minds of the people, and to produce thoſe ſanguinary ſcenes, which afterwards were acted in that country. This work, however, procured Carra's appointment as one of the keepers of the national library; and he was afterwards nominated a member of the convention. He was diſtinguiſhed by the keenneſs of his temper, and was employed as a commiſſioner to the army; but having, as was ſaid, propoſed to proſcribe the Bourbon family and place the Duke of York on the throne of France, he came under the charge of being in the pay of England. However ridiculous this may appear, Carra having always ſided with the Girondiſts, fell with that party, and was guillotined in Oct. 1793. He was author of a Hiſtory of Moldavia and Wallachia, 12mo; New Principles of Philoſophy, 2 vols 4to; An Eſſay on Aerial Navigation, in which he gives ſome directions for the guiding of Air Balloons; An Examination of Animal Magnetiſm; Hiſtorical Memoirs of the Baſtile, and other tracts.

CARRAC, or } a name given by the Portugueſe CARRACA, } to the veſſels they ſend to Braſil and the Eaſt Indies; being large, round built, and fitted for fight as well as burden. Their capacity lies in their depth. They are narrower above than underneath; and have ſometimes 7 or 8 floors: they carry about 2000 tons, and are capable of lodging 2000 men; but of late they are little uſed. Formerly they were in uſe among the knights of Rhodes, as well as among the Genoeſe, and other Italians. It is a cuſtom among the Portugueſe, when the carracs return from India, not to bring any boat or ſloop for the ſervice of the ſhip beyond the iſland of St Helena; but to ſink them on purpoſe, in order to take from the crew all hopes of ſaving themſelves, in caſe of ſhipwreck.

* CARRACK. See Carack.

CARRAGO, in antiquity, a kind of defence about a camp, compoſed of carts, waggons, &c. faſtened together.

CARRAM, a village in Northumberland, ſeated on the Tweed.

CARRANTS, in Dorſetſhire, near Winterborn St Martins.

(1.) CARRARA, a ci-devant principality of Italy, lately annexed to the territory of Lucca.

(2.) Carrara, a town in Carrara, N° 1.

(3.) Carrara marble, a ſpecies of fine white marble, which is got from a quarry, near the town, N° 2. It was called *marmor lunenſe*, and *liguſtrium* by the ancients. It is diſtinguiſhed from the Parian marble, by being harder and leſs bright.

* CARRAT. See Caract.

CARRAVIERA, a town of Turkey in Europe, with a Greek archbiſhop's ſee. Lon. 22. 25. E. Lat. 40. 27. N.

CARRAW, a village in Northumberland, between Scavonſhale and Welton.

* CARRAWAY. See Caraway.—Nay, you ſhall ſee mine orchard, where, in an arbour, we will eat a laſt year's pippin of my own grafting, with a diſh of *carraways*, and ſo forth; come, couſin, ſilence, and then to bed. *Shak. Hen.* IV.

(1.) CARRE, a river in Somerſetſhire.

(2.) Carre, Lewis, an eminent French mathematician, born in Brie, A. D. 1663. His father was a farmer and intended him for the church, but young Carre had an utter averſion to it. In the midſt of his fathers diſpleaſure on this account, while he was uncertain what to follow, he was engaged as an amanuenſis by the celebrated Malebranche, under whom, he, for 7 years, ſtudied mathematics and metaphyſics; branches of ſciences which he afterwards taught. In 1697, M. Varignon made choice of him as one of his eleves in the academy; and in 1700, Carre publiſhed the firſt complete work on the Integral Calculus, which he afterward republiſhed with corrections. He was ſoon after made an aſſociate and at laſt a penſioner and mechanician of the academy. He was author of many pieces on mathematics, of which 20 are printed in the memoirs of the French academy of ſciences, and the reſt remain in MS. in their poſſeſſion. He died in 1718, aged 48.

CARRETTA, in old records, a cart load.

(1.) * CARRIAGE. *n. ſ.* [*carriage*, Fr. baggage, from *carry*.] 1. The act of carrying or tranſporting any thing.—If it ſeems ſo ſtrange to move this obeliſk, for ſo little ſpace, what may we think of the *carriage* of it out of Egypt? *Wilkins.* 2. Conqueſt; acquiſition.—Solyman reſolved to beſiege Vienna, in good hope, that, by the *carriage* away of that, the other cities would, without reſiſtance, be yielded. *Knolles.* 3. Vehicle; that in which any thing is carried.—What horſe or *carriage* can take up and bear away all the loppings of a branchy tree at once? *Watts.* 4. The frame upon which cannon is carried.—He commanded the great ordnance to be laid upon *carriages*, which lay bound in great and unweildy timber, with rings faſtened thereto, and could not handſomely be removed to and fro. *Knolles.* 5. Behaviour; perſonal manners.—Let them have ever ſo learned lectures of breeding, that which will moſt influence their *carriage* will be the company they converſe with, and the faſhion of thoſe about them. *Locke.* 6. Conduct; meaſures, practices.—He adviſed the new governour to have ſo much diſcretion in his *carriage*, that there might be no notice taken in the exerciſe of his religion. *Clarendon.* 7. Management; manner of tranſacting. Not uſed.—The manner of *carriage* of the buſineſs, was as if there had been ſecret inquiſition upon him. *Bacon.*

(2.) Carriage block, a cart made on purpoſe for carrying mortars and their beds from place to place.

(3.) Carriage of a cannon, (§ 1. *def.* 4.) is made of two planks of wood, commonly half the length of the gun, called the cheeks, and joined by 3 wooden tranſums, ſtrengthened with 5 bolts of iron. It is mounted on two wheels, but on a march has two fore wheels with limbers added. The principal parts of a carriage are the cheeks, tranſums, bolts, plates, train, bands, bridge, bed, hooks, trunnion holes, and capſquare.

(4.) Carriages. For the conſtruction and mechanical principles of wheel carriages, ſee Mechanics.

(5.) Carriages and services. See Bonnage and Services.

(6.) Carriage truck, two ſhort planks of wood, ſupported on two axle trees, having four trucks of ſolid wood for carrying mortars or guns upon battery, where their own carriages cannot go. They are drawn by men.

(1.) CARRICK, the ſouthern diviſion of Ayrſhire. It borders on Galloway; ſtretches 32 miles in length; and is a hilly country fit for paſturage. The chief rivers are the Stenchiar and Girvan, both abounding with ſalmon; here are alſo ſeveral lakes and foreſts; and the people on the coaſt employ themſelves in the herring-fiſhery, though they have no harbour of any conſequence. The only towns are Bergen and Maybole. The prince of Wales is earl of Carrick.

(2.) Carrick on Shannon, a town of Ireland, in the county of Leitrim, 77 miles from Dublin.

(3.) **Carrick on Suir**, a town of Ireland, in the county of Tipperary and province of Munſter. Lon. 7. 14. W. Lat. 52. 16. N.

CARRICKASTICKEN, 1. a mountain: and, 2. a river of Ireland, in Louth county, Leinſter.

CARRICKBEG, a town of Ireland, in Waterford, on the Suir, oppoſite to Carrick, N° 3.

CARRICK-EDMUND, a town in Louth, Ireland.

(1.) CARRICK-FERGUS, a town of Ireland, in the county of Antrim and province of Ulſter. It is a town and county in itſelf; is very rich and populous, with a good harbour; and is governed by a mayor, recorder, and ſheriffs.—It was formerly of far greater conſequence than at preſent, as appears from the mayor having been admiral of a conſiderable extent of coaſt in the counties of Down and Antrim, and the corporation enjoying the cuſtoms paid by all veſſels within theſe bounds, the creeks of Belfaſt and Bangor excepted. This grant was repurchaſed, and the cuſtom-houſe transferred to Belfaſt. Here is the ſkeleton of a fine houſe built by Lord Chicheſter in the reign of James I. an old Gothic church with many family monuments, and a very large old caſtle. The town was formerly walled round, and part of the walls ſtill remain entire. It is ſeated on Carrick-Fergus Bay, and is noted for being the landing place of king William in 1690. Here alſo Thurot made a deſcent in 1759, took poſſeſſion of the caſtle, and carried away hoſtages for the ranſom of the town; but being ſoon after purſued by commodore Elliot, his 3 ſhips were taken, and himſelf was killed.

(2.) **Carrick-Fergus Bay**, a ſafe and ſpacious bay, in the Iriſh channel.

CARRICKMACROSS, a town of Ireland, in Monaghan, Ulſter, 42 miles from Dublin.

CARRICKMINES, in Dublin, Leinſter.

CARRIDEN, [pronounced Carrin,] a pariſh of Scotland, in W. Lothian, about 18 miles W. from Edinburgh, on the S. ſide of the Frith of Forth, 2 miles long from E. to W. and 1 broad. The ſoil is light, and the climate healthy. It abounds in free-ſtone and coals. There are two collieries, which produce above 40,000 tons annually; whereof above 16,000 are exported, beſides culm. Upwards of 32,000 buſhels of ſalt are made annually, at theſe collieries. There are 4 villages in the pariſh. The population in 1801, was 1490.

(1.) * CARRIER. *n. ſ.* [from *To carry.*] 1. One who carries ſomething.—You muſt diſtinguiſh between the motion of the air, which is but a *vehiculum cauſi*, a *carrier* of the ſounds, and the ſounds conveyed. *Bacon's Nat. Hiſt.* 2. One whoſe profeſſion or trade is to carry goods for others.—I have rather made it my choice to tranſcribe all, than to venture the loſs of my originals by poſt or *carrier. Pierce's Letters.* 3. A meſſenger; one who carries a meſſage—

> The welcome news in the letter found,
> The *carrier*'s not commiſſioned to expound;
> It ſpeaks itſelf. *Dryden's Religio Laici.*

4. The name of a ſpecies of pigeons, ſo called from the reported practice of ſome nations, who ſend them with letters tied to their necks, which they carry to the place where they were bred, however remote.—There are tame and wild pigeons, and of tame there are croppers, *carriers*, runts. *Walton's Angler.*

(2.) **Carrier.** See § 1. *def.* 2. A common carrier, having the charge and carriage of goods, is to anſwer for the ſame, or the value, to the owner. And where goods are delivered to a carrier, and he is robbed of them, he ſhall be charged and anſwer for them, becauſe of the hire. See Assumpsit, § 3, case VI. If a common carrier who is offered his hire, and who has convenience, refuſes to carry goods, he is liable to an action, in the ſame manner as an inn-keeper who refuſes to entertain a gueſt. One brought a box to a carrier, with a large ſum of money, and the carrier demanded of the owner what was in it; he anſwered, that it was filled with ſilks and ſuch like goods. The carrier took it, was robbed, and adjudged to make it good, but a ſpecial acceptance, as, *provided there is no charge of money*, would have excuſed the carrier. If a perſon deliver to a carrier's book-keeper two bags of money ſealed up, to be carried from London to Exeter, and tell him that it is L. 200, and take his receipt for it, with promiſe of delivery for 10s. per cent carriage and riſk; though it be proved, that there was L. 400 in the bags, if the carrier be robbed, he ſhall anſwer only for L. 200, becauſe there was a particular undertaking for that ſum and no more; and his reward, which makes him anſwerable, extends no farther. If a carrier or porter loſes goods which he is intruſted to carry, a ſpecial action in the caſe lies againſt him, on the cuſtom of the realm, and not trover; and ſo of a common carrier by boat. Alſo againſt a lighter man ſpoiling goods he is to carry, by letting water come to them.

(3.) **Carrier pigeon, or courier pigeon.** See § 1. def. 4. Theſe birds, though carried hoodwinked, 20, 30, or even 100 miles, will find their way in a very little time to the place where they were bred. They are trained to this ſervice in Turkey and Perſia; and are carried firſt, while young, ſhort flights of half a mile, afterwards more, till at length they will return from the fartheſt part of the kingdom. Every Baſhaw has a baſket of theſe pigeons bred in the ſeraglio, which, upon any emergent occaſion, as an inſurrection, or the like, he diſpatches, with letters braced under their wings, to the ſeraglio; which proves a more ſpeedy method, as well as a more ſafe one, than any other; he ſends out more than one pigeon, however, for fear of accidents. Lithgow aſſures us, that one of theſe birds will carry a letter from Babylon to Aleppo, which is 30 days journey, in 48 hours. This practice is very ancient; Hirtius and Brutus, at the ſiege of Modena, held a correſpondence by pigeons. And Ovid tells us, that Tauroſthenes, by a pigeon ſtained with purple, gave notice to his father of his victory at the Olympic Games, ſending it to him at Œgina. In modern times, the moſt noted were the pigeons of Aleppo, which ſerved as couriers at Alexandretta and Bagdad. But this uſe of them has been laid aſide for the laſt 30 or 40 years, becauſe the Curd robbers killed the pigeons. The manner of ſending advice by them was this: they took pairs which had young ones, and carried them on horſeback to the place from whence they wiſhed them to return, taking care to let them have a full view. When the news arrived. the correſpondent tied a billet to the pigeon's foot, and let her looſe. The bird, impatient to ſee its young, flew off like lightning, and arrived at Aleppo in ten hours from Alexandretta, and in two days from Bagdad. It was eaſy for them to find their way back, as Aleppo may be diſcovered at an immenſe diſtance. This pigeon has nothing peculiar in its form, except its noſtrils, which, inſtead of being ſmooth and even, are ſwelled and rough See Columba.

(4.) Carrier, John Baptiſt, one of the many monſters whoſe barbarous diſpoſition the French revolution unſhakled, was born at Aurillac in 1756. Having paſſed through the inferior functions of the law, he was choſen deputy for the department of Cantal, in the national convention, an honour which his denunciations and ſanguinary acts, fully merited. He was ſent with a band of cut-throats into La Vendee, where he butchered great numbers, merely becauſe they were ſuſpected of favouring royalty. At Nantes his ſavage brutality was particularly diſplayed: there he cauſed no fewer than 24 to be put to death in one day, 4 of whom were only about 14 years of age; and as if at a loſs to vent his rage, he forced crowds of miſerable people on board covered barges, and ſunk them in the Loire. It would be ſhocking to humanity to attempt an enumeration of the ferocious acts of this wretch and his ſavage crew: on the fall of the *Mountain* party he was ordered back to Paris, tried before the revolutionary tribunal, condemned, and guillotined, Dec. 15, 1794.

CARRIG, a dangerous rock on the coaſt of Argyll-ſhire, which is covered at high water.

CARRIGANS, } two towns of Ireland, in Donegal, Ulſter.
CARRIGART, }

CARRIGNENEELOGH, a village in Cork, 147 miles from Dublin.

CARRINGOON, near Mallow, Cork.

(1.) * CARRION, *adj.* [from the ſubſtantive.] Relating to carcaſes; feeding upon carcaſes.—

Match to match I have encounter'd him,
And made a prey for *carrion* kites and crows,
Ev'n of the bonny beaſts he lov'd ſo well.
Shak. Henry VI.

(2.) * Carrion. *n. ſ.* [*charogne*, Fr.] 1. The carcaſe of ſomething not proper for food.—

This foul deed ſhall ſmell above the earth,
With *carrion* men groaning for burial. *Shak.*

—Ravens are ſeen in flocks where a *carrion* lies, and wolves in herds to run down a deer. *Temple.* 2. Any fleſh ſo corrupted as not to be fit for food.—

The wolves will get a breakfaſt by my death,
Yet ſcarce enough their hunger to ſupply,
For love has made me *carrion* ere I die. *Dryden.*

3. A name of reproach for a worthleſs woman.—Shall we ſend that fooliſh *carrion*, Mrs Quickly, to him, and excuſe his throwing into the water? *Shakeſpeare.*

Carrion di los Condes, a town of Spain, in Leon, on the frontiers of Old Caſtile. It has ten pariſh churches, ten convents, and two hoſpitals, and is ſituated on the river Carrion, 18 miles N. of Placentia, and 40 W. of Burgos.

CARRISTON. See Careston.

CARROBALISTA, in the ancient military art, denotes a ſpecies of balista, mounted on wheels, and drawn by horſes; by which it differed from the manubalista, which being leſſer and lighter was thrown by the hand.

CARROCERUM, or } in writers of the mid-
CARROCIUM, } dle age, denotes the banner, or chief flag of an army, which was mounted on a kind of chariot, and drawn by oxen.

(1.) CARKOCK, a mountain in Cumberland, 755 yards above the ſea level.

(2.) Carrock passage, near Fowey Haven, Cornwall.

CARROG, or Kerrog, a river in Caernarvonſ.

(1.) CARRON, a ſmall but remarkable river of Scotland, which riſes about the middle of the iſthmus between the friths of Forth and Clyde. Both its ſource, and the place where it runs into the ſea, are within Stirling-ſhire, which it divides into two nearly equal parts. The whole length of its courſe, from W. to E. is not above 14 miles. It falls into the frith of Forth about 3 miles NE. of Falkirk. The ſtream is but ſmall, yet there is no river in Scotland, and few in the whole iſland of Britain, whoſe banks have been the ſcenes of ſo many memorable tranſactions. When the Roman empire was in all its glory, and had its eaſtern frontiers upon the Euphrates, the banks of Carron were its bounderies upon the NW. for the wall of Antoninus, which was raiſed to mark the limits of that mighty empire, ſtood in the neighbourhood of this river, and ran parallel to it for ſeveral miles. See Antoninus, N° 4. Near the middle of its courſe, in a pleaſant valley, ſtand two beautiful mounts, called the *Hills of Dunipace*, which are taken notice of by moſt Scottiſh hiſtorians as monuments of great antiquity. See Dunipace. From the valley of Dunipace, the Carron runs in a deep and hollow channel, with ſteep banks on both ſides; paſſing by the foundations of the ancient Roman bridge; not far from which, was the ſcene of the memorable conference between the Scottiſh patriot, Sir William Wallace. and Robert Bruce, father of king Robert I. which opened the eyes of the latter to a juſt view, both of his own true intereſt, and that of his country. After the river has left the bridge of Larbert, it comes up to another ſmall valley, through the midſt of which it has now worn a ſtraight channel: having formerly taken a conſiderable compaſs, as appears by the tract of the old bed, ſtill viſible. The high banks upon the S. ſide, give this valley the appearance of a ſpacious bay; and, according to tradition, there was once a harbour here; which is confirmed by pieces of broken anchors found in it, ſome of them within the memory of people yet alive. The ſtream tides would ſtill flow near the place, if they were not kept back by the dam-head built acroſs the river at Stenhouſe; and there is reaſon to believe, that the frith flowed conſiderably higher in former ages, than it does at preſent. In the neighbourhood of this valley, upon the S. ſtand the ruins of ancient *Camelon*; which, after it was abandoned by the Romans, was probably inhabited, for ſome ages, by the natives of the country. Another ancient monument, called Arthur's oven, once ſtood upon the banks of Carron;

but was, with a ſpirit truly Gothic, entirely demoliſhed about 50 years ago. The corner of a ſmall incloſure between Stenhouſe and the Carron iron works, is pointed out as the place of its ſituation. This is generally ſuppoſed to have been a Roman work; though it is not eaſy to conceive what could be their motive for erecting ſuch a fabric, at ſo great a diſtance from any other of their works, in a ſpot which muſt then have been little frequented. The form of it is ſaid to have been perfectly round, riſing perpendicular for ſome yards at firſt, but afterwards gradually contracted, till it terminated in a narrow orifice at the top. Antiquaries are not agreed whether it had been a temple, or a trophy, or a mauſoleum; but Buchanan thinks it had been a temple of Terminus. Hector Boetius ſays, that there were benches of ſtone all around it, upon the inſide; and that there had been a large ſtone for ſacrificing upon, or an altar upon the S. ſide. As the Carron extends over the half of the iſthmus, and runs ſo near the ancient boundaries of the Roman empire, the adjacent country became the ſcene of many battles. Hiſtorians mention a bloody battle fought near this river, between the Romans and the confederate army of the Scots and Picts in the beginning of the 5th century. The ſcenes of ſome of Oſſian's poems were, in the opinion of Mr M'Pherſon, upon the banks of this river. Here Fingal fought with Caracal, the ſon of the *king of the world*, ſuppoſed to have been Caracalla the ſon of the emperor Severus. Here alſo young Oſcar, the ſon of Oſſian, performed ſome of his heroic exploits. About half a mile from the river, and near Falkirk, lies the field of that battle which was fought between Wallace and the Engliſh in the beginning of the 14th century. It goes by the name of *Graham's muir*, from the brave Sir John Graham, who fell there, and whoſe grave ſtone is ſtill to be ſeen in the church-yard of Falkirk. The Carron, now no longer rolling amidſt the din of arms, contributes its aid to the more uſeful arts of peace. See N° 2. It is navigable for ſome miles near its mouth, and a conſiderable trade is carried on upon it by ſmall craft; for the convenience of which, its channel has been ſtraightened and much ſhortened, and the Great Canal (ſee Canal, N° 9,) has its entrance from it. On its banks lies the village of

(2.) **Carron**, remarkable for having in its neighbourhood,

(3.) **Carron works**, an extenſive iron foundery, 2 miles from Falkirk, and 3 from the entry of Carron into the Forth. Above 100 acres of land have been converted into reſervoirs for water, diverted from the river, by magnificent dams built about two miles above the works, which, after turning 18 large wheels for the manufacture, falls into a little navigation that conveys their caſtings to the ſea. Theſe works were eſtabliſhed in 1760, and are the greateſt of the kind in Europe, as well as the moſt elegant and accurate in their machinery. Upwards of 1600 men are employed, to whom is paid about 1000 l. weekly; 6500 tons are ſmelted annually from the mineral, and caſt into cannons, cylinders, grates, &c. Above 5000 pieces of cannon are made annually at theſe works; many of which are exported to Ruſſia, Germany, and other parts of Europe. Three kinds of ore are employed, which are mixed together in regular proportions. The firſt is a ſpecies of decompoſed *hæmatites* brought from Cumberland, which ſtains the hand with blood-red colour; the ſecond is of a yellowiſh brown colour, and of a rocky hardneſs; the third is the ſpecies of ironſtone called the *ſeptaria*, or *geodes* of Dunbar, from being found in the neighbourhood of that town. From the proportions of theſe ores an iron is procured, equal, if not ſuperior, to the *ſable iron* imported from Ruſſia. The works are carried on by a chartered company, with a capital of 150,000 l. ſterling, which is divided into 600 ſhares, but retained in the hands of a few individuals. To a ſtranger the approach to theſe works is ſtriking and terrible. The illumination of the atmoſphere, produced by the burning matter, the roaring blaſts of the immenſe bellows, and the noiſe of weighty hammers, ſtriking upon the reſounding anvils, recalls to the imagination the idea of Vulcan and his Cyclops occupied in preparing thunderbolts, or of a volcano in actual eruption, ready to pour forth its melted bowels.

(4.) **Carron**, a river of Scotland, in Kincardineſhire, which riſes at the foot of the Lowther, and after running E. for ſeveral miles, and dividing the pariſhes of Duriſdeer and Morton, falls into the Nith.

CARRONADE, a ſhort kind of ordnance, capable of carrying a large ball, and uſeful in cloſe engagements at ſea; ſo named from the Carron. See Gunnery.

CARROOR, or **Caroor**, a town and fort of Hindooſtan, in Myſore. It was entered by Gen. Meadows, in June 1790, having been evacuated by the troops of Tippoo Sultan. It is 65 miles E. by S. of Coimbettore. Lon. 78. 12. E. Lat. 10. 57. N.

CARROSIO, a town of Piedmont.

(1.) * **CARROT**. *n. ſ.* [*carôte*, Fr. *daucus*, Lat.] An eſculent root.—*Carrots*, though garden roots, yet they do well in the fields for feed. *Mortimer.*—His ſpouſe orders the ſack to be immediately opened, and greedily pulls out of it half a dozen bunches of *carrots*. *Dennis.*

(2.) **Carrot**, in botany. See Daucus.

(3.) **Carrot, candy**. See Athamanta.

(4.) **Carrot, deadly**. See Thapsia.

* **CARROTINESS**. *n. ſ.* [from *carroty*.] Redneſs of hair.

* **CARROTY**. *adj.* [from *carrot*.] Spoken of red hair, on account of its reſemblance in colour to carrots.

CARROUSAL, a courſe of horſes and chariots, or a magnificent entertainment exhibited by princes on ſome public rejoicing. See Carousal. It conſiſts in a cavalcade of gentlemen, richly dreſſed and equipped after the manner of ancient cavaliers, divided into ſquadrons, meeting in ſome public place, and practiſing juſts, tournaments, &c. The laſt carrouſals were in the reign of Louis XIV.—The Moors introduced cyphers, liveries, and other ornaments of their arms, with trappings, &c. for their horſes. The Goths added creſts, plumes, &c.

* **CARROWS**. *n. ſ.* [an Iriſh word.] The *carrows* are a kind of people that wander up and down to gentlemen's houſes, living only upon

cards and dice; who, though they have little or nothing of their own, yet will they play for much money. *Spenſer on Ireland.*

(1.) CARRUCA, [from *carrus*, Lat.] in antiquity, a ſplendid kind of car, or chariot, mounted on 4 wheels, richly decorated with gold, ſilver, ivory, &c. in which the emperors, ſenators, &c. were carried.

(2.) CARRUCA, or CARUCA, is alſo uſed in writers of the middle age, for a plough; and ſometimes for CARRUCATE.

(1.) CARRUCAGE, [*carucagium*,] a kind of tax anciently impoſed on every plough. See CARRUCATE and HIDAGE.

(2.) CARRUCAGE, CARUCAGE, or CARUAGE, in huſbandry, denotes the plowing of ground, either ordinary, as for grain, hemp, and flax; or extraordinary, as for woad, dyers weed, rape, and the like.

CARRUCATE, [*carrucata*,] in our ancient laws, a plough-land, or as much arable ground as can be tilled in a year with one plough. In Doomſday Inquiſition, the arable land is eſtimated in carrucates, the paſture in hides, and meadow in acres. Skene makes the *carrucata* the ſame with *hilda*; or *hida terræ*; Littleton the ſame with *ſoc.* The meaſure of a carrucate appears to have differed in reſpect of place as well as time. In the reign of Richard I. it was eſtimated at 60 acres, and in another charter of the ſame reign at 100 acres; in the time of Edward I. at 180 acres; and in the 23d year of Edward III. a carrucate in Burceſter contained 112 acres, and in Middleton 150. By a ſtatute under William III, a plough-land is rated at L. 50 *per annum*, and may contain houſes, mills wood, paſture, &c.

(1.) * *To* CARRY, *v. a.* [*charier*, Fr. from *currus*, Lat.] 1. To convey *from* a place; oppoſed to *bring*, or convey *to* a place; often with a particle, ſignifying departure; as, *away*, *off*.—When he dieth, he ſhall *carry* nothing *away*. *Pſ.* xlix. 18. —I mean to *carry* her *away* this evening by the help of theſe two ſoldiers. *Dryden's Spaniſh Fryar.* —The Seres returning, *carried off* either their goods or money as they liked beſt. *Arbuthnot.* 2. To tranſport.—They began to *carry* about in beds thoſe that were ſick. *Mark* vi. 55.—The ſpecies of audibles ſeem to be *carried* more manifeſtly through the air than the ſpecies of viſibles. *Bacon.* —Where many great ordnance are ſhot off together, the ſound will be *carried*, at the leaſt, twenty miles upon the land. *Bacon.* 3. To bear; to have about one.—Do you take out bones like ſurgeons I have met with, who *carry* them about in their pockets. *Wiſeman's Surg.* 4. To take; to have with one.—If the ideas of liberty and volition were *carried* along with us in our minds, a great part of the difficulties that perplex men's thoughts would be eaſier reſolved. *Locke.* 5. To convey by force.—

Go, *carry* Sir John Falſtaff to the Fleet;
Take all his company along with him. *Shak.*

6. To effect any thing.—There are ſome vain perſons, that whatſoever goeth alone, or moveth upon greater means if they have never ſo little hand in it, they think it is they that *carry* it. *Bac.* 7. To gain in competition.—How many ſtand for conſulſhips?—Three, they ſay; but it is thought of every one Corialanus will *carry* it. *Shakeſ.* 8. To gain after reſiſtance.—

The count wooes your daughter,
Lays down his wanton ſiege before her beauty;
Reſolves to *carry* her; let her conſent,
And we'll direct her now, 'tis beſt to bear it. *Shak.*

—The town was diſtreſſed, and ready for an aſſault, which, if it had been given, would have coſt much blood; but yet the town would have been *carried* in the end. *Bacon's Henry* VII. 9. To gain; with *it*; that is, to prevail. [*le porter*, Fr.]

Are you all reſolved to give your voices?
But that's no matter; the greater part *carries it.*
Shakeſpeare.

—If the numerouſneſs of a train, muſt *carry it*, virtue may go follow Aſtræa, and vice only will be worth the counting. *Glanville.* 10. To bear out; to face through: with *it*.—If a man *carries it*, there is ſo much money ſaved; and if he be detected, there will be ſomething pleaſant in the frolick. *L'Eſtrange.* 11. To carry external appearance.—My niece is already in the belief that he's mad; we may *carry it* thus for our our pleaſure, and his penance. *Shakeſp.* 12. To manage; to tranſact.—The ſenate is generally as numerous as our houſe of commons; and yet *carries* its reſolutions ſo privately, that they are ſeldom known *Addiſon on Italy.* 13. To behave; to conduct: with the reciprocal pronoun.—Neglect not alſo the examples of thoſe that have *carried themſelves* ill in the ſame place. *Bacon.*—He attended the king into Scotland, where he did *carry himſelf* with much ſingular ſweetneſs and temper. *Wotton.* 14. Sometimes with *it*: as, ſhe *carries it* high. 15. To bring forward; to advance in any progreſs. —It is not to be imagined how far conſtancy will *carry* a man; however, it is better walking ſlowly in a rugged way, than to break a leg and be a cripple. *Locke.*—Their is no vice which mankind *carries* to ſuch wild extremes, as that of avarice. *Swift.* 16. To urge; to bear forward with ſome kind of external impulſe.—Men are ſtrongly *carried* out to, and hardly took from, the practice of vice. *South.*—Ill nature, paſſion, and revenge, will *carry* them too far in puniſhing others; and therefore God hath certainly appointed government to reſtrain the partiality and violence of men. *Locke.* 17. To bear; to have; to obtain.—In ſome vegetables, we ſee ſomething that *carries* a kind of analogy, to ſenſe; they contract their leaves againſt the cold; they open them to the favourable heat. *Hale.* 18. To exhibit to ſhow; to diſplay on the outſide: to ſet on view.—The aſpect of every one in the family *carries* ſo much ſatisfaction, that it appears he knows his happy lot. *Addiſon.* 19. To imply; to import.—It *carries* too great an imputation of ignorance, lightneſs or folly, for men to quit and renounce their former tenets, preſently upon the offer of an argument, which they cannot compriſe.—He thought it *carried* ſomething of argument in it, to prove that doctrine. *Watts on the Mind.* 21. To have annexed; to have any thing joined; with the particle *with*. —There was a righteous and a ſearching law, directly forbidding ſuch practices; and they knew that it *carried with* it the divine ſtamp. *South.* —The obvious portions of extenſion, that affect our ſenſes, *carry with* them into the mind the i-

idea

dea of finite. *Locke.* 22. To convey or bear any thing united or adhering, by communication or motion.—We ſee alſo manifeſtly, that ſounds are *carried* with wind: and therefore ſounds will be heard further with the wind than againſt the wind. *Bacon.* 23. To move or continue any thing in a certain direction.—His chimney is *carried* up through the whole rock, ſo that you ſee the ſky through it notwithſtanding the rooms lie very deep. *Addiſon.* 24. To puſh on ideas, arguments, or any arguments, or any thing ſucceſſive in a train.—Manethes, that wrote of the Egyptians, hath *carried* up their government to an incredible diſtance. *Hale.* 25. To receive; to endure: not in uſe.—Some have in readineſs ſo many odd ſtories, as there is nothing but they can wrap it into a tale, to make others *carry it* with more pleaſure. *Bacon.* 26. To convey by means of ſomething ſupporting —*Carry* camomile, or wild thyme, or the green ſtrawberry, upon ſticks, as you do hops upon poles. *Bacon.* 27. To bear, as trees.—Set them a reaſonable depth, and they will *carry* more ſhoots upon the ſtem. *Bacon's Nat. Hiſtory.* 28. To fetch and bring, as dogs.—Young whelps learn eaſily to *carry*; young popinjays learn quickly to ſpeak. *Aſcham.* 29. *To carry off.* To kill.—Old Parr lived to one hundred and fifty three years of age, and might have gone further, if the change of air had not *carried* him *off.* *Temple.* 30. *To carry on.* To promote; to help forward.—It *carries on* the ſame deſign that is promoted by authours of a graver turn, and only does it in another manner. *Addiſ.* 31. *To carry on.* To continue; to put forward from one ſtage to another.—Æneas's ſettlement in Italy was *carried on* through all the oppoſitions in his way to it, both by ſea and land. *Addiſon.* 32. *To carry on.* To proſecute; not to let ceaſe.—France will not conſent to furniſh us with money ſufficient to *carry on* the war. *Temple.* 33. *To carry through.* To ſupport; to keep from failing, or being conquered.—That grace will *carry* us, if we do not wilfully betray our ſuccours, victoriouſly *through* all difficulties. *Hammond.*

(2.) * *To* Carry. *v. n.* 1. A hare is ſaid, by hunters, to *carry*, when ſhe runs on rotten ground, or on froſt, and it ſticks to her feet. 2. A horſe is ſaid to *carry well*, when his neck is arched, and he holds his head high; but when his neck is ſhort, and ill ſhaped, and he lowers his head, he is ſaid to *carry low*.

(1.) CARRYING, among falconer's, ſignifies a hawk's flying away with the quarry; a bad quality, which ſhe acquires either by a diſlike of the falconer, or not being ſufficiently broke to the lure.

(2.) Carrying, in the menage. See *To* Carry, § 2. *def.* 2. All horſes that arm themſelves carry low, but a horſe may carry low without arming. A French branch, or gigot, is preſcribed as a remedy againſt carrying low.

(3.) Carrying wind, a term applied by dealers in horſes to one that frequently toſſes his noſe as high as his ears, and does not carry handſomely. The difference between carrying in the wind, and beating upon the hand, is this: that the horſe that carries in the wind puts up his head without ſhaking, and ſometimes beats upon the hand. The oppoſite to carrying in the wind, is arming and carrying low; and even between theſe two there is a difference in wind.

* CARRY-TALE. *n. ſ.* [from *carry* and *tale.*] A talebearer.—

Some *carry-tale*, ſome pleaſeman, ſome ſlight
zany,
Told our intents before. *Shak. Love's Lab. Loſt.*

CARS. See Kars.

CARSCHI, a large and populous town of Aſia, in Tartary.

CARSEFAIRN, or } CARSEFERN, } a pariſh of Scotland, in the ſtewartry of Galloway. The ſurface is hilly and the ſoil partly wet, partly dry. About 1000 acres are arable and 2000 meadow ground. The population, in 1792, as ſtated by the rev. Mr Smith, in his report to Sir J. Sinclair, was 461; and had decreaſed 148 ſince 1755. The number of ſheep was 30,000; of goats 40; of horſes 83, and of black cattle 1203. The farmers, at an average, pay L. 200 yearly rent, and few of them have leſs than 2000 ſheep. They are all in eaſy circumſtances.

CARSE of Gowrie. See Gowrie.

CARSEY, a town near Hadley, Suffolk.

CARSHALTON, a beautiful village, in Surry, SW. of Croydon, near Banſtead Downs. It is ſituated among a number of ſprings and rivulets, which meeting together in the midſt of it, form a river, called Wandel.

CARSINGTON, NW. of Wirkſworth, Derby.

CARSON, 3 miles NW. of Shrewſbury.

CARSOP, 6 miles NW. of Hereford.

CARSTAIRS, William, an eminent Scots divine, whoſe merit and good fortune called him to act in great ſcenes, was the ſon of a clergyman, and born at a village near Glaſgow, in 1649. He ſtudied theology; and the perſecutions and oppreſſions of government, both in regard to civil and religious liberty, having excited his ſtrongeſt indignation, he went to Utrecht. During his reſidence abroad, he became acquainted with penſionary Fagel, and entered with warmth into the intereſt of the Prince of Orange. On his return to Scotland to procure a licence, he became diſguſted with the inſolent conduct of Abp. Sharp, and went back to Holland; where he knew that religious liberty was reſpected. His prudence, his reſerve, and his political addreſs, were ſtrong recommendations to the prince of Orange; who employed him in perſonal negociations in Holland, England, and Scotland. Upon the elevation of his maſter to the Britiſh throne, he was appointed the king's chaplain for Scotland, and employed in ſettling the affairs of that kingdom. William, who carried politics into religion, was ſolicitous that epiſcopacy ſhould be eſtabliſhed there. Carſtairs, more verſant in the affairs of his native country, ſaw all the impropriety of this project, and the danger that would ariſe from enforcing it. His reaſonings, his remonſtrances, his intreaties, overcame the firmneſs of king William. He yielded to conſiderations founded alike in policy and in prudence; and to Carſtairs, Scotland is indebted for the full eſtabliſhment of its church in the Preſbyterian form of government. The death of king William was a ſevere affliction to him; and it happened before that prince had provided for him with the liberality he deſerved. He was continued, however, in his office by Q. Anne; and was appointed principal to the Univerſity of Edinburgh. He was one of the miniſters of the city, and four times moderator of the general aſſembly. Placed at the head of the church, he proſecuted its intereſt with zeal and integrity. Nor were his influence and activity confined to religion. They were exerted with ſucceſs in promoting the arts and ſciences. The univerſities of Scotland owe him the higheſt obligations. He procured for them an augmentation of the ſalaries of their profeſſors; a circumſtance to which may be aſcribed their reputation, as it enabled them to cultivate with ſpirit the different branches of knowledge. A zeal for truth, a love of moderation and order, prudence and humanity, diſtinguiſhed principal Carſtairs. His religion had no mixture of auſterity; his ſecular tranſactions were attended with no imputation of artifice; and the verſatility of his talents made him paſs with eaſe from a court to a college. He was among the laſt who ſuffered torture before the privy council, to make him divulge the ſecrets entruſted to him, which he firmly reſiſted; and after the revolution, that inhuman inſtrument, the THUMBIKINS, was given to him in a preſent by the council. It is ſaid that K. William expreſſed a deſire to ſee it, and actually tried it on, bidding the Dr turn the ſcrew; but at the 3d turn, he cried out, "Hold, hold, Doctor! another turn would make me confeſs any thing!" This excellent perſon died in 1715; and in 1774 his *State Papers and Letters*, with an account of his life, were publiſhed in one vol. 4to, by the rev. Dr M'Cormick.

CARSUGHI, Ramier, a Jeſuit, born at Citerna in Tuſcany, in 1647, was the author of a Latin poem, entitled, *Ars bene ſcribendi*, which is eſteemed both for the elegance of the ſtyle and for the excellent precepts it contains. He alſo wrote ſome good epigrams. He died in 1709.

CARSWELL, a village 6 miles NE. of Morpeth, on the coaſt of Cumberland.

(1.) * CART. *n. ſ.* See Car. [*cræt*, *crat*, Sax.] 1. A carriage in general.—The Scythians are deſcribed by Herodotus to lodge always in *carts*, and to feed upon the milk of mares. *Temple.* 2. A wheel-carriage, uſed commonly for luggage.—

Now while my friend, juſt ready to depart,
Was packing all his goods in one poor *cart*,
He ſtopp'd a little.—— *Dryden's Juvenal.*

3. A ſmall carriage with two wheels, uſed by huſbandmen, diſtinguiſhed from a *waggon*, which has 4 wheels.—

Alas! what weights are theſe that load my heart!
I am as dull as winter ſtarved ſheep,
Tir'd as a jade in overloaden *cart*. *Sidney.*

4. The vehicle in which criminals are carried to execution.—

The ſquire, whoſe good grace was to open the ſcene,
Now fitted the halter, now travers'd the *cart*,
And often took leave, but was loth to depart.
Prior.

(2.) Cart. See § 1. *d. f.* 2. In London and Weſtminſter carts ſhall not carry more than 12 ſacks of meal, 750 bricks, 1 chaldron of coals, &c. on pain of forfeiting one of the horſes. (6 Geo. I. cap. 6.) Carr-men are forbidden to ride either on their carts or horſes. They are to lead or drive them on foot through the ſtreets on the forfeiture of ten ſhillings. (Stat. 1 Geo. I. cap. 57.) Scripture mentions a ſort of carts or drags uſed by the Jews for threſhing. They were ſupported on low thick wheels, bound with iron, which were rolled up and down on the ſheaves, to break them, and force out the corn. Something ſimilar obtained among the Romans, under the denomination of PLAUSTRA. See *Virg. Georg.* I. See alſo Trahea.

(3.) Cart, Black. See N° 5.

(4.) Cart of war, a peculiar kind of artillery anciently in uſe among the Scots. They are thus deſcribed in an act of parliament, A. D 1456: "It is thocht ſpeidfull, that the King mak requeiſt to certain of the great burrows of the land that are of ony myght, to mak carts of weir, and in ilk cart twa gunnis, and ilk ane to have twa chalmers, with the remanent of the graith that effeirs thereto, and an cunnand man to ſhut thame." By another act, A. D. 1471, the prelates and barons are commanded to provide ſuch carts of war againſt their old enemies the Engliſh.

(5.) Cart, white and black, two rivers in Renfrewſhire, which unite near Renfrew, and fall into the Clyde.

(1.) * *To* Cart. *v. a.* [from the noun.] To expoſe in a cart by way of puniſhment.—

Democritus ne'er laugh'd ſo loud,
To ſee bawds *carted* through the croud. *Hudib.*

(2.) * *To* Cart. *v. n.* To uſe carts for carriage.—Oxen are not ſo good for draught, where you have occaſion to *cart* much, but for winter ploughing. *Mortimer.*

CARTAMA, a town of Spain in Grenada, formerly very conſiderable. It is ſeated at the foot of a mountain near the river Guadala-Medina. Lon. 4. 28. W. Lat. 36. 40. N.

CART-BOTE, in law, ſignifies wood to be employed in making and repairing inſtruments of huſbandry.

CARTE, Thomas, the hiſtorian, was the ſon of Mr Samuel Carte prebendary of Litchfield, and born in 1686. When he was reader in the abbey-church at Bath, he took occaſion, in a ſermon on the 30th Jan. 1714, to vindicate Charles I. with reſpect to the Iriſh maſſacre, which drew him into a controverſy with Mr Chandler the diſſenting miniſter; and on the acceſſion of the houſe of Hanover, he refuſed to take the oaths, and put on a lay habit. He is ſaid to have acted as ſecretary to biſhop Atterbury before his troubles; and in 1722, being accuſed of high treaſon, a reward of 1000l. was offered for apprehending him: but Q. Caroline, the patroneſs of learned men, obtained leave for him to return home in ſecurity. He publiſhed, 1. An edition of Thuanus, in 7 volumes folio. 2. The Life of the firſt Duke of Ormond, 3 vols. folio. 3. The Hiſtory of England; 4 vols. folio. 4. A Collection of Original Letters and Papers concerning the affairs of England, 2 vols. 8vo.; and ſome other works. He died in April 1754. His hiſtory of England ends in 1654. His deſign was to have brought it down to the Revolution; for which purpoſe he had taken great pains in copying every thing valuable that could be met with in England, Scotland, France, Ireland, &c.—He had a ſeries of memoirs from the beginning to the end of Charles IId's reign. At his death, all his papers fell into the hands of his widow, and are now depoſited in the Bodleian library, having been delivered by Mr Jernegan, her 2d huſband, to the univerſity, 1778, for a valuable conſideration. Whilſt they were in this gentleman's poſſeſſion, the earl of Hardwicke paid 200 l. for the peruſal of them. For a conſideration of 300 l. Mr Macpherſon had the uſe of them; and from theſe and other materials compiled his hiſtory and ſtate papers. Mr Carte was a man of a ſtrong conſtitution and indefatigable application. When the ſtudies of the day were over, he eat heartily; and was cheerful and entertaining.

* Carte Blanche. [Fr.] A blank paper; a paper to be filled up with ſuch conditions as the perſon to whom it is ſent thinks proper.

(1.) * CARTEL. *n. ſ.* [*cartel*, Fr. *cartello*, Ital.] 1. A writing containing, for the moſt part, ſtipulations between enemies.—As this diſcord among the ſiſterhood is likely to engage them in a long and lingering war, it is the more neceſſary that there ſhould be a *cartel* ſettled among them. *Addiſon's Freeholder.* 2. Anciently any public paper.

They flatly diſavouch
To yield him more obedience, or ſupport;
And as to perjur'd duke of Lancaſter,
Their *cartel* of defiance, they prefer. *Daniel.*

(2.) Cartel, 1. An agreement for the exchange of priſoners of war. 2. A letter of defiance or a challenge to decide a controverſy, either in a tournament or in a ſingle combat. See Duel.

(3.) Cartel ship, a ſhip commiſſioned in time of war to exchange the priſoners of two hoſtile powers; alſo to carry any propoſal from the one to the other. The officer who commands her muſt carry no cargo, ammunition, or implements of war, except a ſingle gun for ſignals.

(1.) * CARTER. *n. ſ.* [from *cart*.] The man who drives a cart, or whoſe trade it is to drive a cart.—

Let me be no aſſiſtant for a ſtate,
But keep a farm and *carter*. *Shakeſpeare.*

—The Divine goodneſs never fails, provided that, according to the advice of Hercules to the *carter*, we put our own ſhoulders to the work. *L'Eſtr.*—It is the prudence of a *carter* to put bells to his horſes, to make them carry their burdens cheerfully. *Dryden.*

(2.) Carter, a county of Teneſſee, in Waſhington diſtrict.

(3.) Carter, a hill of Scotland, in Roxburghſhire, 14 miles from Jedburgh.

CARTERET, a maritime county of N. Carolina, in the diſtrict of Newbern, bounded on the S. by Core ſound; N. by Craven; E. and NE. by Pemlico ſound and Neus river; and on the W. by Onſlow county. It contains 3019 free citizens, and 713 ſlaves. The chief town is Beaufort.

CARTER FELLS, hills of England, in Northumberland, near Blackburn.

CARTERSVILLE, a town of Virginia, in Powhatan county, on the S. ſide of James river, 40 miles above Richmond.

CARTES, Rene Des, one of the moſt eminent philoſophers and mathematicians in the 17th century. He was deſcended of an ancient family in Touraine in France, and was born 31ſt March 1596. At the Jeſuit's college at La Fleche, he made a very great progreſs in the learned languages and polite literature, and became acquainted with Father Marſenne. His father deſigned him for the army; but his tender conſtitution then not permitting him to expoſe himſelf to ſuch fatigues, he was ſent to Paris, where he launched into gaming, in which he had prodigious ſucceſs. Here Marſenne perſuaded him to return to ſtudy; which he purſued till he went to Holland, in May 1616, where he engaged as a volunteer among the prince of Orange's troops. While he lay in garriſon at Breda, he wrote a *Treatiſe on Muſic*, and laid the foundation of ſeveral of his works. He was at the ſiege of Rochelle in 1628; returned to Paris; and, a few days after his return, at an aſſembly of men of learning, in the houſe of Monſignor Bagni the Pope's nuncio, was prevailed upon to explain his ſentiments with regard to philoſophy, when the nuncio urged him to publiſh his ſyſtem. Upon this he went to Amſterdam, and from thence to Franeker, where he began his *Metaphyſical Meditations*, and drew up his *Diſcourſe on Meteors*. He made a ſhort tour to England; and not far from London, made ſome obſervations concerning the declination of the magnet. He returned to Holland, where he finiſhed his *Treatiſe on the World*. His books made a great noiſe in France; and in Holland his ſyſtem bid fair to diſcard the old philoſophy. Voetius, being rector of the univerſity of Utrecht, procured his philoſophy to be prohibited, and wrote againſt him; but he immediately publiſhed a vindication of it. In 1647 he returned to France, where the king ſettled a penſion of 3000 livres upon him. Chriſtina, queen of Sweden, invited him into that kingdom, received him with the greateſt civility, and engaged him to attend her every morning at 5 o'clock, to inſtruct her in philoſophy. She alſo deſired him to reviſe and digeſt all his unpubliſhed writings, and to form a complete body of philoſophy from them. She likewiſe propoſed to allow him a revenue, and to form an academy of which he was to be the director. But theſe deſigns were fruſtrated by his death in 1650. His body was interred at Stockholm, and 17 years afterwards removed to Paris, where a magnificent monument was erected to him in the church of St Genevieve du Mont. Dr Halley, in a paper concerning optics, obſerves, that though ſome of the ancients mentions refraction as an effect of tranſparent mediums, Des Cartes was the firſt who diſcovered the laws of refraction, and reduced dioptrics to a ſcience. As to his philoſophy, Dr Keil, in his introduction to his examination of Dr Burnet's theory of the earth, ſays that Des Cartes was ſo far from applying geometry to natural philoſophy, that his whole ſyſtem is one continued blunder on account of his negligence in that point; the laws obſerved by the planets in their revolutions round the ſun, not agreeing with his theory of vortices. His philoſophy has accordingly given way to the more accurate diſcoveries and demonſtrations of the Newtonian ſyſtem.

CARTESIANS, a ſect of philoſophers who adhered to the ſyſtem of Des Cartes, founded on the two following principles, the one metaphyſical, the other phyſical. The metaphyſical one is, *I think, therefore I am;* the phyſical, that *nothing exiſts but ſubſtance.* Subſtance he makes of two kinds; the one a ſubſtance that thinks, the other a ſubſtance extended; whence actual thought, and actual extenſion, are the eſſence of ſubſtance. The eſſence of matter being thus fixed in extenſion, the Carteſians conclude that there is no vacuum, nor any poſſibility thereof in nature; but that the univerſe is abſolutely full: mere ſpace is excluded by this principle; becauſe extenſion being implied in the idea of ſpace, matter is ſo too. Upon theſe principles the Carteſians explained mechanically how the world was formed, and how the preſent celeſtial phenomena came to take place. See ASTRONOMY, *Index.*

(I. 1.) CARTHAGE, a famed city of antiquity, the capital of Africa Propria; and which for many years, diſputed with Rome the ſovereignty of the world. According to Velleius Paterculus, this city was built 65; according to Juſtin and Trogus 12, according to others 100 or 140 years, before the foundations of Rome were laid. It is on all hands agreed, that the Phœnicians were the founders. It was ſituated on a peninſula of the Mediterranean, 36 miles NW. of Tunis, and 352 E. of Algiers; directly oppoſite to Rome. Lon. 9. 7. E. Lat. 36. 30. N.

(2.) CARTHAGE, ANCIENT GRANDEUR OF. At the third Punic war, Carthage appears to have been one of the firſt cities in the world.—It was no leſs than 360 ſtadia, or 45 miles in circumference, and was joined to the continent by an iſthmus, 25 ſtadia or 3 miles and a furlong in breadth. On the W. ſide, projected a long track of land half a ſtadium broad; which ſhooting out into the ſea ſeparated it from a lake or moraſs, and was ſtrongly fortified on all ſides by rocks and a ſingle wall. In the middle of the city ſtood the citadel of Byrſa, having on the top of it a temple ſacred to Æſculapius, ſeated upon rocks on a very high hill, to which the aſcent was by 60 ſteps. On the S. ſide the city was ſurrounded by a triple wall, 30 cubits high; flanked all round by parapets and towers, at equal diſtances of 480 feet. Every tower had its foundation ſunk 32 feet deep, and was 4 ſtories high, though the walls were but 2: they were arched; and in the lower part, correſponding in depth with the foundations above mentioned, where ſtalls large enough to hold 300 elephants with their fodder, &c. Over theſe were ſtalls and other conveniences for 4000 horſes; and there was likewiſe room for lodging 20,000 foot and 4000 cavalry, without incommoding the inhabitants. There were two harbours, which had one common entrance 70 feet broad, and ſhut up with chains. The firſt was appropriated to the merchants; and included in it a vaſt number of places of refreſhment, and all kinds of accommodations for ſeamen. The 2d, as well as the iſland of COTHON, in the midſt of it, was lined with large keys, in which were receptacles for ſheltering 220 ſhips of war. Over theſe were magazines of all ſorts of naval ſtores. The entrance into each of theſe receptacles was adorned with two marble pillars of the Ionic order; ſo that both the harbour and iſland repreſented on each ſide two magnificent galleries. Near this iſland was a temple of Apollo, in which was a ſtatue of the god, of maſſy gold; and the inſide of the temple all lined with plates of the ſame metal, weighing 1000 talents. The city was 23 miles in circumference, and contained 700,000 inhabitants. Of their power we may have ſome idea, by the quantity of arms they delivered up to the Roman conſuls. The whole army was aſtoniſhed with the long train of carts loaded with them, which were thought ſufficient to have armed all Africa. On this occaſion there were put into the hands of the Romans, 2000 catapultæ, 200,000 complete ſuits of armour, with an innumerable quantity of ſwords, darts, javelins, arrows, and beams armed with iron, which were thrown from the ramparts by the baliſtæ.

(3.) CARTHAGE, ANCIENT HISTORY OF. The beginning of the Carthaginian hiſtory, like that of moſt other nations, is obſcure and uncertain. In the 7th year of Pygmalion king of Tyre, his ſiſter Eliſa, or DIDO, is ſaid to have fled, with ſome of her companions and vaſſals, from the cruelty and avarice of her brother Sichæus. She firſt touched at the iſland of Cyprus, where ſhe met with a prieſt of Jupiter, who was deſirous of attending her, to which ſhe readily conſented, and fixed the prieſthood in his family. At that time it was a cuſtom in the iſland of Cyprus, for the young women to go on certain ſtated days, before marriage, to the ſea ſide, to look for ſtrangers, that might poſſibly arrive on their coaſts, in order to proſtitute themſelves for gain, that they might thereby acquire a dowry. Out of theſe the Tyrians ſelected 80, whom they carried along with them. From Cyprus they ſailed directly for the coaſt of Africa, and at laſt ſafely landed in the province called *Africa Propria,* not far from Utica. The inhabitants received their countrymen with great joy, and invited them to ſettle among them. The common fable is, that the Phœnicians impoſed upon the Africans in the following manner: They deſired, for their intended ſettlement, only as much ground as an ox's hide would encompaſs. This requeſt the Africans laughed at; but were ſurpriſed, when, upon their granting it, they ſaw Eliſa cut the hide into the ſmalleſt ſhreds, by which means it ſurrounded a large territory; in which ſhe built the citadel called BYRSA. The learned, however, are now unanimous in exploding this fable; and it is certain that the Carthaginians for many years paid an annual tribute to the Africans for the ground they poſſeſſed. The new city ſoon became populous and flouriſhing, by the acceſſion of the neighbouring Africans, who came thither at firſt with a view of traffic. In a ſhort time it became ſo conſiderable, that *Iarbas,* a neighbouring prince, thought of making himſelf maſter of it without any effuſion of blood. In order to this, he deſired that an embaſſy of ten of the moſt noble Carthaginians might be ſent him; and, upon their arrival, propoſed to them a marriage with Dido, threatening war in caſe of a refuſal. The ambaſſadors, being afraid to deliver this meſſage, told the queen that Iarbas deſired ſome perſon might be ſent him who was capable of civilizing his Africans; but that there was no poſſibility of finding any of her ſubjects, who would leave his relations for the converſion of ſuch barbarians. For this they were reprimanded by the queen, who told them that they ought to be aſhamed of refuſing to live in any manner for the benefit of their country. Upon this they informed her of the true nature of their meſſage from Iarbas; and that, according to her own deciſion, ſhe ought to ſacrifice herſelf for the good of her country. The unhappy queen, rather than ſubmit to be the wife of ſuch a barbarian, cauſed a funeral pile to be erected, and put an end to her life with a dagger. This is Juſtin's account of the death of queen Dido, and is the moſt probable; Virgil's ſtory of her amour with Æneas, being looked upon as fabulous, even in the days of Macrobius, as we are informed by that hiſtorian. How long monarchial government continued in Carthage, or what happened to this ſtate in its infancy, we are altogether ignorant, the Punic archives being deſtroyed by the Romans; ſo that there is a chaſm in the Carthaginian hiſtory for above 300 years. It, however, appears, that from the beginning, the Carthaginians applied themſelves to maritime affairs, and were formidable by ſea in the time of Cyrus and Cambyſes. From Diodorus Siculus and Juſtin, it appears, that the principal ſupport of the Carthaginians were the mines of Spain, in which country they ſeem to have eſtabliſhed themſelves very early. By the riches drawn from theſe mines, they were enabled to equip ſuch formidable fleets, as we are told, they fitted out in the time of Cyrus and Cambyſes. Juſtin inſinuates, that the firſt Carthaginian ſettlement in Spain happened when the city of Gades, now Cadiz, was in its infancy. The Spaniards, finding this new colony begin to flouriſh, attacked it with a numerous army, inſomuch that the inhabitants were obliged to call in the Carthaginians to their aid. The latter very readily granted their requeſt, and not only repulſed the Spaniards, but made themſelves maſters of almoſt the whole province in which their new city ſtood. By this ſucceſs, they were encouraged to attempt the conqueſt of the whole country; but having to do with very warlike nations, they could not puſh their conqueſts to any great length at firſt; and it appears from the accounts of Livy and Polybius, that the greateſt part of Spain remained unſubdued till the times of Hamilcar, Aſdrubal, and Hannibal.

(4.) **CARTHAGE, HISTORY OF, TO ITS FIRST WAR WITH THE ROMANS.** About the year before Chriſt 503, the Carthaginians entered into a treaty with the Romans. It related chiefly to matters of navigation and commerce. From it we learn, that the whole iſland of Sardinia, and part of Sicily, were then ſubject to Carthage; that they were very well acquainted with the coaſts of Italy, and had made ſome attempts upon them before this time; and that, even at this early period, a ſpirit of jealouſy had taken place between the two republics. About this period, the Carthaginians wiſhed to diſcontinue the tribute they had hitherto paid the Africans for the ground on which their city ſtood. But, notwithſtanding all their power, they were obliged to conclude a peace, one of the articles of which was, that the tribute ſhould be continued. By degrees they extended their power over all the iſlands in the Mediterranean, Sicily excepted; and for the conqueſt of this, they made vaſt preparations, about A. A. C. 480. Their army conſiſted of 300,000 men; their fleet was compoſed of upwards of 2000 men of war, and 3000 tranſports; and with ſuch an immenſe armament, they made no doubt of conquering the whole iſland in a ſingle campaign. In this, however, they found themſelves miſerably deceived. Hamilcar their general, having landed their numerous forces, inveſted Himera, a city of conſiderable importance. He carried on his attacks with the greateſt aſſiduity; but was at laſt attacked in his trenches by Gelon and Theron, the tyrants of Syracuſe and Agrigentum, who gave the Carthaginians one of the greateſt overthrows mentioned in hiſtory: 150,000 were killed in the battle and purſuit, and all the reſt taken priſoners; ſo that of ſo mighty an army, not a ſinge perſon eſcaped. Of the 2000 ſhips of war and 3000 tranſports, of which the Carthaginian fleet conſiſted, 8 ſhips only, which then happened to be out at ſea, eſcaped; theſe ſailed for Carthage; but were all caſt away, and every ſoul periſhed, except a few who were ſaved in a ſmall boat, and at laſt reached Carthage with the diſmal news of the total loſs of the fleet and army. No words can expreſs the conſternation of the Carthaginians upon receiving the news of ſo terrible a diſaſter. Ambaſſadors were immediately diſpatched to Sicily, with orders to conclude a peace upon any terms. They put to ſea without delay; and landing at Syracuſe, threw themſelves at the conqueror's feet. They begged Gelon, with many tears, to receive their city into favour, and grant them a peace on whatever terms he ſhould chooſe to preſcribe. He granted their requeſt, upon condition that Carthage ſhould pay him 2000 talents of ſilver, to defray the expence of the war; that they ſhould build two temples, where the articles of the treaty ſhould be lodged and kept as ſacred; and that for the future they ſhould abſtain from human ſacrifices, This was not thought a dear purchaſe of a peace for which there was ſuch occaſion; and to ſhow their gratitude for Gelon's moderation, the Carthaginians complimented his wife Demarata with a crown of gold worth 100 talents. From this time we find little mention of the Carthaginians for 70 years. Some time during this period, however, they had greatly extended their dominions in Africa, and likewiſe ſhaken off the tribute which gave them ſo much uneaſineſs. They had warm diſputes with the inhabitants of Cyrene, about a regulation of the limits of their reſpective territories. The conſequence of this diſpute was a war, which reduced both nations ſo low, that they agreed to a ceſſation of arms. At laſt it was agreed, that each ſtate ſhould appoint two commiſſaries, who ſhould ſet out from their reſpective cities on the ſame day, and that the ſpot on which they met ſhould be the boundary of both ſtates. In conſequence of this, two brothers called *Philæni* were ſent out for Carthage, who partly by their ſuperior celerity, and ſtill more by their uncommon patriotiſm, gained a large extent of territory to Carthage.

See Philæni. About A. A. C. 412, ſome diſputes happening between the Egeſtines and Selinuntines, inhabitants of two cities in Sicily, the former called in the Carthaginians to their aſſiſtance. Hannibal, whom they appointed general, was empowered to raiſe an army equal to the undertaking, and equip a ſuitable fleet. They alſo appointed funds for defraying the expence of the war. Hannibal, having landed his forces, immediately marched for Selinus. In his way he took Emporium, and having arrived at Selinus, he immediately inveſted it. The beſieged made a very vigorous defence; but at laſt the city was taken by ſtorm, and the inhabitants were treated with the utmoſt cruelty. All were maſſacred by the ſavage conquerors, except the women who fled to the temples; and who were ſaved, not through the mercy of the Carthaginians, but becauſe they were afraid, that, if driven to deſpair, they would ſet fire to the temples, and conſume the treaſures they expected in thoſe places. About 16,000 were maſſacred; 2250 eſcaped to Agrigentum; 5000 women and children were carried away captives; the temples were plundered, and the city raſed to the ground. Hannibal next laid ſiege to Himera; wiſhing to revenge the death of his grandfather Hamilcar, who had been ſlain before it by Gelon. His troops behaved with undaunted courage; but finding his battering engines not to anſwer his purpoſe ſufficiently, he undermined the wall, ſupporting it with large beams of timber, to which he afterwards ſet fire, and thus laid part of it flat on the ground. Notwithſtanding this advantage, the Carthaginians were ſeveral times repulſed with great ſlaughter; but at laſt they became maſters of the place, and treated it as they had done Selinus. The Carthaginians were now ſo much elated, that they meditated the reduction of the whole iſland. But as the age and infirmities of Hannibal rendered him incapable of commanding the forces alone, they joined in commiſſion with him Imilcar the ſon of Hanno, one of the ſame family. On the landing of the Carthaginian army, all Sicily was alarmed, and the principal cities were put into the beſt ſtate of defence. The Carthaginians immediately marched to Agrigentum, and began to batter the walls with great fury. The beſieged, however, defended themſelves with incredible reſolution, in a ſally burnt all the machines raiſed againſt their city, and repulſed the enemy with great ſlaughter. The Syracuſans in the mean time, being alarmed at the danger of Agrigentum, ſent an army to its relief. On their approach they were immediaetly attacked by the Carthaginians; but after a ſharp diſpute the latter were defeated, and forced to the walls of Agrigentum with the loſs of 6000 men. Had the Agrigentines now ſallied out, and fallen upon the fugitives, in all probability the Carthaginian army muſt have been deſtroyed; but either through fear or corruption, they refuſed to ſtir out of the place, and this occaſioned the loſs of it. Immenſe booty was found in the city; and the Carthaginians behaved with their uſual cruelty, putting all the inhabitants to the ſword, not excepting even thoſe who had fled to the temples. Their next attempt was deſigned againſt the city of Gela: but the Geleans, being greatly alarmed, implored the protection of Syracuſe; and, at their requeſt, Dionyſius was ſent to aſſiſt them with 2000 foot and 400 horſe. The Geleans were ſo well ſatisfied with his conduct, that they treated him with the higheſt marks of diſtinction; they even ſent ambaſſadors to Syracuſe to return thanks for the important ſervices done them by ſending him thither; and ſoon after he was appointed generaliſſimo of the Syracuſan forces and thoſe of their allies againſt the Carthaginians. In the mean time Imilcar made an incurſion into the territories of Gela and Camarina, and having ravaged them in a dreadful manner, he carried off ſuch immenſe quantities of plunder, as filled his whole camp. He then marched againſt the city of Gela; but though it was indifferently fortified, he met with a very vigorous reſiſtance; and it held out for a long time without receiving any aſſiſtance from its allies. At laſt Dionyſius came to its aſſiſtance with an army of 50,000 foot and 1000 horſe. With theſe he attacked the Carthaginian camp, but was repulſed with great loſs; after which he called a council of war, the reſult of whoſe deliberation was, that as the enemy was ſo much ſuperior in ſtrength, the inhabitants ſhould be perſuaded to abandon the country, as the only means of ſaving their lives. In conſequence of this, a trumpet was ſent to Imilcar to deſire a ceſſation of arms till the next day, in order, as was pretended, to bury the dead, but in reality to give the people of Gela an opportunity to eſcape. In the beginning of the night moſt of the citizens left the place; and he himſelf with the army followed them about midnight. To amuſe the enemy, he left 2000 of his light armed troops behind him, commanding them to make fires all night, and ſet up loud ſhouts as if the army ſtill remained in town. At day-break theſe took the ſame route as their companions, and purſued their march with great celerity. The Carthaginians finding the city deſerted by moſt of its inhabitants, immediately entered it, putting to death all who remained; after which, Imilcar having thoroughly plundered it, moved towards Camarina The inhabitants of this city had likewiſe been drawn off by Dionyſius, and it underwent the ſame fate with Gela. Notwithſtanding theſe ſucceſſes, Imilcar finding his army greatly weakened, partly by the caſualties of war, and partly by a plague which broke out in it, ſent a herald to Syracuſe to offer terms of peace. This was very agreeable to the Syracuſans, and a peace was immediately concluded, upon the following terms, viz. That the Carthaginians, beſides their ancient acquiſitions in Sicily, ſhould ſtill poſſeſs the countries of the Silicani, the Selinuntines, the Himereans, and Agrigentines; that the people of Gela and Camarina ſhould be permitted to reſide in their reſpective cities, upon the paying an annual tribute to the Carthaginians; and that the other Sicilians ſhould preſerve their independency, except the Siyracuſans, who ſhould continue in ſubjection to Dionyſius. That tyrant, however, concluded this peace only to gain time, and to put himſelf in a condition to attack the Carthaginian territories with greater force. He acquainted the Syracuſans with his deſign, and they approved of it; upon which he gave up to the fury of the populace

lace the perſons and poſſeſſions of the Carthaginians who reſided in Syracuſe, and traded there on the faith of treaties. As many of their ſhips were then in the harbour, laden with cargoes of great value, the people immediately plundered them; and ranſacked all their houſes in a moſt outrageous manner. This example was followed throughout the whole iſland; and in the mean time Dionyſius diſpatched a herald to Carthage with a letter to the ſenate, telling them, that if they did not immediately withdraw their garriſons from all the Greek cities in Italy, the people of Syracuſe would treat them as enemies. With this demand, however, he did not allow them time to comply; for he immediately advanced with his army to Mount Eryx, near which ſtood the city of Motya, a Carthaginian colony of great importance, which he immediately inveſted. But ſoon after, leaving his brother Leptines to carry on the ſiege, he himſelf went with the greateſt part of his forces to reduce the cities in alliance with the Carthaginians. He deſtroyed their territories with fire and ſword, cut down all their trees: and then he ſat down before Egeſta and Entella, moſt of the other towns having opened their gates at his approach; but theſe baffling his utmoſt efforts, he returned to Motya, and puſhed on the ſiege of that place with the utmoſt vigour. The Carthaginians, in the mean time, though alarmed at the meſſage ſent them by Dionyſius, and though reduced to a miſerable ſituation by the plague, which had broke out in their city, did not deſpond, but ſent officers to Europe, with conſiderable ſums, to raiſe troops with the utmoſt diligence. Ten gallies were alſo ſent from Carthage to deſtroy all the ſhips that were found in the harbour of Syracuſe. The admiral, according to his orders, entered the harbour in the night, without being diſcerned by the enemy; and having ſunk moſt of the ſhips he found there, returned without the loſs of a man. All this while the Motyans defended themſelves with incredible vigour; while their enemies, deſirous of revenging the cruelties exerciſed upon their countrymen by the Carthaginians, fought like lions. At laſt the place was taken by ſtorm, and the Greek ſoldiers began a general maſſacre. For ſome time Dionyſius was not able to reſtrain their fury: but at laſt he proclaimed that the Motyans ſhould fly to the Greek temples; which they accordingly did, and a ſtop was put to the ſlaughter; but the ſoldiers thoroughly plundered the town, in which they found a great treaſure. The following ſpring, Dionyſius invaded the Carthaginian territories, and made an attempt upon Egeſta; but here he was again diſappointed. The Carthaginians were greatly alarmed at his progreſs; but next year, notwithſtanding a conſiderable loſs ſuſtained in a ſea-fight with Leptines, Himilco their general landed a powerful army at Panormus, ſeized upon Eryx, and then advancing towards Motya, made himſelf maſter of it, before Dionyſius could ſend any forces to its relief. He next advanced to Meſſana, which he likewiſe beſieged and took; after which moſt of the Siculi revolted from Dionyſius. Notwithſtanding this defection, Dionyſius, finding his forces ſtill amount to 30,000 foot and 3000 horſe, advanced againſt the enemy. At the ſame time, Leptines was ſent with the Syracuſan fleet againſt that of the Carthaginians, but with poſitive orders not to break the line of battle upon any account whatever. But, notwithſtanding theſe orders, he thought proper to divide his fleet, and the conſequence of this was a total defeat; above 100 of the Syracuſan galleys being ſunk or taken, and 20,000 of their men killed in the battle, or in the purſuit. Dionyſius diſheartened by this misfortune, returned with his army to Syracuſe, being afraid that the Carthaginian fleet might become maſters of that city, if he ſhould advance to fight the land army. Himilco immediately inveſted the capital; and had certainly become maſter of it, and the whole iſland, had not a moſt malignant peſtilence obliged him to deſiſt from all further operations. This dreadful malady made great havock among his forces by ſea and land; and to complete his misfortunes, Dionyſius attacked him unexpectedly, ruined his fleet, and made himſelf maſter of his camp. Himilco finding himſelf unable to ſuſtain another attack, came to a private agreement with Dionyſius; who for 300 talents conſented to let him eſcape to Africa, with the ſhattered remains of his fleet and army. Himilco arrived at Carthage, but being unable to bear his misfortunes, put an end to his own life. He had left Mago in Sicily, to take care of the Carthaginian intereſts in the beſt manner he could. In order to this, Mago treated all the Sicilians ſubject to Carthage with the greateſt humanity; and having received a conſiderable number of ſoldiers from Africa, he at laſt formed an army, with which he ventured a battle: in this he was defeated, and driven out of the field, with the loſs of 800 men; which obliged him to deſiſt from farther attempts. Notwithſtanding all theſe diſaſters, the Carthaginians made new attempts upon Sicily; and about A. A. C. 392, Mago landed in it with an army of 80,000 men. Dionyſius, however, reduced him to ſuch ſtraits for want of proviſions, that he was obliged to ſue for peace. This continued for 9 years, at the end of which the war was renewed with various ſucceſs. It continued with little interruption till A. A. C. 367, when the Syracuſan ſtate being rent by civil diſſention, the Carthaginians thought it a proper time to exert themſelves, in order to become maſters of the whole iſland. They fitted out a great fleet, and entered into alliance with Icetas, tyrant of Leontini, who pretended to have taken Syracuſe under his protection. By this treaty, the two powers engaged to aſſiſt each other, in order to expel Dionyſius II. after which they were to divide the iſland between them. The Syracuſans applied for ſuccours to the Corinthians; and they readily ſent them a body of troops under the command of Timoleon. By a ſtratagem, he got his forces landed at Taurominium. The whole of them did not exceed 1200 in number: yet with theſe he marched againſt Icetas who was at the head of 5000 men; his army he ſurpriſed at ſupper, put 300 of them to the ſword, and took 600 priſoners. He then marched to Syracuſe, and broke into one part of the town before the enemy had any notice of his approach: here he took poſt, and defended himſelf with ſuch reſolution, that he could not be diſlodged by the united power of Icetas and the Carthaginians. In this place he remained for ſome time, in expectation of a reinforcement from Corinth; till the arrival of which, he did not think it practicable to extend his conqueſts. The Carthaginians, being appriſed that the Corinthian ſuccours were detained by tempeſtuous weather at Thurium, poſted a ſtrong ſquadron, under Hanno their admiral, to intercept them in their paſſage to Sicily. But that commander, not imagining the Corinthians would attempt a paſſage to Sicily in ſuch a ſtormy ſeaſon, left his ſtation at Thurium, and ordering his ſeamen to crown themſelves with garlands, and adorn their veſſels with bucklers both of the Greek and Carthaginian form, ſailed to Syracuſe in a triumphant manner. Upon his arrival there, he told the troops in the citadel, that he had taken the ſuccours Timoleon expected, thinking by this means to intimidate them to ſurrender. But, while he thus trifled away his time, the Corinthians marched with great expedition to Rhegium, and, taking the advantage of a gentle breeze, were eaſily wafted over into Sicily. Mago, the Carthaginian general, was no ſooner informed of the arrival of this reinforcement, than he was ſtruck with terror, though the whole Corinthian army did not exceed 4000 men; and, ſoon after, fearing a revolt of his mercenaries, in ſpite of all the remonſtrances of Icetas, he ſailed for Africa; where, aſhamed of his unparalleled cowardice, he laid violent hands on himſelf. His body was hung upon a gallows, to deter ſucceeding generals from forfeiting their honour in ſo flagrant a manner. After this, Timoleon carried all before him. He obliged Icetas to renounce his alliance with Carthage, depoſed him, and continued his military preparations with the greateſt vigour. On the other hand, the Carthaginians ſent over an army of 70,000 men with a fleet of 200 ſhips of war, 1000 tranſports laden with warlike engines, armed chariots, horſes, and all ſorts of proviſions. This immenſe multitude, however, was overthrown on the banks of the Cremeſus, by Timoleon; 10,000 were left dead on the field of battle; and of theſe, above 3000 were native Carthaginians of noble families. About 15,000 were taken priſoners; all their baggage and proviſions, with 200 chariots, 1000 coats of mail, and 10,000 ſhields, fell into Timoleon's hand. The ſpoil, which conſiſted chiefly of gold, and ſilver, was ſo immenſe, that the whole Sicilian army was three days in collecting it and ſtripping the ſlain. Leaving his mercenary forces upon the enemy's frontiers to ravage the country; he returned to Syracuſe with the reſt of his army, where he was joyfully received. Soon after, Icetas concluded a peace with the Carthaginians; and, having aſſembled an army, ventured an engagement with Timoleon, but was utterly defeated; and himſelf with Eupolemus his ſon, and Euthymus general of his horſe, were brought bound to Timoleon by their own ſoldiers. The two firſt were immediately executed as tyrants and traitors, and the laſt murdered in cold blood; Icetas's wives and daughters were likewiſe put to death after a public trial. In a ſhort time after, Mamercus, another of the Carthaginian confederates, was overthrown by Timoleon, with the loſs of 2000 men. Theſe misfortunes induced the Carthaginians to conclude a peace on the following terms: That all the Greek cities ſhould be ſet free; that the river Halycus ſhould be the boundary between the territories of both parties; that the natives of the cities ſubject to the Carthaginians ſhould be allowed to withdraw, if they pleaſed, to Syracuſe, or its dependencies, with their families and effects; and laſtly, that Carthage ſhould not for the future, give any aſſiſtance to the remaining tyrants againſt Syracuſe. About A. A. C. 316, the Carthaginians engaged in another bloody war with the Sicilians, the particulars of which the reader will find narrated under the article SYRACUSE. It is only neceſſary here to mention, that the Carthaginians, although at firſt very ſucceſſful in their war with AGATHOCLES, tyrant of Syracuſe, were ſoon after, by a ſingular and bold manœuvre, attacked in their own territories, their generals Hanno and Bomilcar defeated with great loſs, and their capital itſelf beſieged, by that prince, at the very time his own capital, Syracuſe, was beſieged by their general Hamilcar: who was at laſt obliged to raiſe the ſiege, and was defeated and beheaded by the Syracuſans. Theſe defeats led the ſuperſtitious Carthaginians to ſuppoſe they had fallen under the diſpleaſure of their gods, by neglecting, (according to their horrid ſyſtem of prieſtcraft,) to ſacrifice children of noble families to them. They therefore ſacrificed 200 children of the firſt rank, beſides 300 other perſons, who voluntarily offered themſelves, to appeaſe the wrath of their bloody deities. Agathocles, however, continued ſucceſsful for a conſiderable time, till at laſt the tide turned in favour of the Carthaginians; whoſe generals Hanno and Himilco gained two great victories over the troops of Archagathus the ſon of Agathocles, which obliged the tyrant himſelf to return from the Sicilian war. Upon his arrival in Africa, Agathocles reviewed his forces, and found them to conſiſt of 6000 Greeks, as many Samnites, Celtes, and Etruſcans; beſides 10,000 Africans, and 1500 horſe. As he found his troops almoſt in a ſtate of deſpair, he thought this a proper time for offering the enemy battle. The Carthaginians, however, did not accept the challenge: as, they found that by keeping cloſe in their camp, where they had plenty of every thing, they could force the Greeks to ſurrender without ſtriking a ſtroke. Upon this Agathocles attacked the Carthaginian camp with great bravery, made a conſiderable impreſſion upon it, and might perhaps have carried it, had not his mercenaries deſerted him almoſt at the firſt onſet. By this piece of cowardice he was forced to retire with precipitation to his camp, whither the Carthaginians purſued him with great ſlaughter. The next night, the Carthaginians ſacrificed all the priſoners of diſtinction as a grateful acknwledgement to the gods for the victory they had gained. But their barbarous ſuperſtition met with its juſt reward. For while they were employed in this inhuman work, the wind ſuddenly riſing, carried the flames to the ſacred tabernacle near the altar, and from it to the general's tent, and thoſe of the principal officers adjoining to it. A dreadful alarm took place through the whole camp, which was heightened by the rapid progreſs of the fire. For the tents conſiſting of very combuſtible materials, and the wind blowing in a moſt violent manner, the whole camp was quickly in a blaze; and many of the ſoldiers endeavouring to carry off their arms, and the rich baggage of their officers, periſhed in the flames. Many of thoſe who attempted to eſcape met with a fate equally unhappy: For, after Agathocles had received the laſt blow, the Africans deſerted him, and were in that inſtant coming over in a body to the Carthaginians. Theſe, the perſons who were flying from the flames took to be the whole Syracuſan army advancing in order of battle to attack their camp. Upon this a dreadful confuſion enſued. Some took to their heels; others fell down in heaps one upon another; and others engaged their comrades, miſtaking them for the enemy: 5000 men loſt their lives in this tumult, and the reſt took refuge in Carthage; nor could the appearance of day-light, for ſome time, diſſipate their terrible apprehenſions. In the mean time, the African deſerters, obſerving the great confuſion the Carthaginians were in, and not knowing the meaning of it, were ſo terrified, that they thought it ſafeſt to return to the place from whence they came. The Syracuſans ſeeing a body of troops advancing towards them in good order, concluded that the enemy were marching to attack them. The conſequence was much the ſame as in the Carthaginian camp; for coming to blows with one another, they ſcarce recovered their ſenſes upon the return of light, and the inteſtine fray was ſo bloody, that it coſt Agathocles 4000 men. This diſaſter ſo diſheartened the tyrant, that he immediately contrived to make his eſcape privately; which he, with great difficulty, effected. After his departure, his two ſons were immediately put to death by the ſoldiers, who, chooſing a leader from among themſelves, made peace with the Carthaginians upon the following conditions: 1. That the Greeks ſhould deliver up all the places they held in Africa, receiving from them 300 talents; 2. That ſuch of them as were willing to ſerve in the Carthaginian army ſhould be kindly treated, and receive the uſual pay; and, 3. That the reſt ſhould be tranſported to Sicily, and have the city of Selinus for their habitation, During this war, the Agrigentines finding the Carthaginians and Syracuſans had mutually weakened each other, took the opportunity of recovering many places out of the hands of both parties. See AGRIGENTUM, § 2. From the peace with Syracuſe, to the firſt war with the Romans, we find nothing remarkable in the hiſtory of Carthage.

(5.) **CARTHAGE, HISTORY OF, TO ITS SECOND WAR WITH THE ROMANS.** The firſt Punic war, as it is commonly called, happened about A. A. C. 256. At that time, the Carthaginians were poſſeſſed of extenſive dominions in Africa; they had made conſiderable progreſs in Spain; were maſters of Sardinia, Corſica, and all the iſlands on the coaſt of Italy; and had extended their conqueſts to a great part of Sicily. The occaſion of the firſt rupture between the two republics was as follows. The Mamertines being vanquiſhed in battle, and reduced to great ſtraits by Hiero king of Syracuſe, had reſolved to deliver up Meſſina, the only city they now poſſeſſed, to that prince, with whoſe mild government and ſtrict probity they were well acquainted. Accordingly, Hiero was advancing at the head of his troops to take poſſeſſion of the city, when Hannibal, who at that time commanded the Carthaginian army in Sicily, prevented him by a ſtratagem. He came to meet Hiero, as it were to congratulate him on his victory; and amuſed him while ſome of the Carthaginian troops filed off towards Meſſina. Hereupon the Mamertines, ſeeing their city ſupported by a new reinforcement, were divided into ſeveral opinions. Some were for accepting the protection of Carthage; others were for ſurrendering to the king of Syracuſe; but the greater part were for calling in the Romans to their aſſiſtance. Deputies were accordingly diſpatched to Rome, offering the poſſeſſion of the city to the Romans, and in the moſt moving terms imploring protection. This, after ſome debate, was agreed to; and the conſul Appius Claudius received orders to attempt a paſſage to Sicily, at the head of a powerful army. Being obliged to ſtay ſome time at Rome, however, Caius Claudius, a perſon of great intrepidity and reſolution, was diſpatched with a few veſſels to Rhegium. On his arrival, he obſerved the Carthaginian ſquadron to be ſo much ſuperior to his own, that he thought it would be little better than madneſs, to attempt at that time to tranſport forces to Sicily. He croſſed the ſtraits, however, and had a conference with the Mamertines, in which he prevailed upon them all to accept of the protection of Rome; and on this he made the neceſſary preparations for tranſporting his forces. The Carthaginians being informed of the reſolutions of the Romans, ſent a ſtrong ſquadron of gallies under the command of Hanno, to intercept the Roman fleet; and accordingly the Carthaginian admiral, coming up with them near the coaſt of Sicily, attacked them with great fury. During the engagement, a violent ſtorm aroſe, which daſhed many of the Roman veſſels againſt the rocks, and greatly damaged their ſquadron; by which means Claudius was forced to retire to Rhegium, which he accompliſhed with great difficulty. Hanno reſtored all the veſſels he had taken; but ordered the deputies ſent with them, to expoſtulate with the Roman general upon the infraction of the treaties ſubſiſting between the two republics. This expoſtulation, however juſt, produced an open rupture; Claudius ſoon after poſſeſſing himſelf of Meſſina. Such was the beginning of the firſt Punic war, which laſted 24 years. The particulars belong properly to the hiſtory of ROME; but we ſhall here give a general ſummary of the principal events of the war. In the 1ſt year the Carthaginians and Syracuſans, not acting in concert at the ſiege of Meſſina, were defeated by the Romans, who in the 2d took Agrigentum. In the 3d the ſucceſs of both parties was nearly equal; but in the 4th Hannibal, after taking 17 Roman gallies, was totally defeated by Duillius, the conſul, with the loſs of 93 ſhips and 14,000 men. Next year, the Romans and their Sicilian allies differing, Hamilcar ſlew 4000 of the latter, and took ſeveral cities; but the Romans having taken many of Hannibal's ſhips and men, the reſt were ſo enraged that they roſe and crucified him. In the 6th year the Romans took Corſica and Sardinia; but next year, after taking Myteſtratum, they would have been all cut off, had it not been for the bravery of Calpurnius Flamma. In the 8th year the celebrated conſul, Regulus, took 18 ſhips and ſunk 8; and next year, he ſunk 30 and took 63 galleys, with the loſs of only 24; after which he ravaged the whole country almoſt to the gates of Carthage. In the 10th year, after killing a monſtrous ſerpent, he ſlew 17,000 Carthaginians, took 5,000, with 18 elephants, and 80 towns, among which were Utica and Tunis. To add to their diſtreſſes the Numidians ravaged their territories, and a famine followed. At laſt Xanthippus, a Lacedæmonian, came to their aſſiſtance with a body of Greeks, and gave the Romans a complete defeat; their whole army, except 2000, being either killed or taken priſoners; and among the latter was Regulus himſelf. In the 11th year, however, the Carthaginians had 104 of their ſhips ſunk, 30 taken, and 15,000 men killed, beſides loſing 9000 under the two Hannos by land. But at laſt they were befriended by the elements, for a terrible ſtorm ariſing, the Romans loſt no fewer than 290 ſhips, only 80 eſcaping of their whole fleet. In the 12th year, the Carthaginians took and burnt Agrigentum; and in the 13th the Romans ſent out a freſh fleet of 260 ſail, the greater part of which was deſtroyed by another ſtorm. Next year, however, they fitted out a 3d fleet, and their proconſul Metellus gave Aſdrubal a terrible defeat, killing 20,000 Carthaginians and many elephants. In the 15th year the Romans beſieged Lilybæum, (ſee LILYBÆUM,) whereupon the Carthaginians ſent Regulus to Rome to treat of a peace; inſtead of which he oppoſed it, and on his return was put to a cruel death. See REGULUS. Adherbal their admiral defeated the Roman fleet under Pulcher; deſtroying 90 galleys, killing 8,000, and taking 20,000 priſoners. Another Roman fleet of 120 galleys and 800 tranſports was deſtroyed by a ſtorm. The ſiege of Lilybæum continued to the end of the war; and little elſe remarkable occurred, till the peace, except the brave defence of Eryx, by Hamilcar Barcas, the father of the celebrated Hannibal. (See AMILCAR.) Peace was at laſt concluded upon terms very unfavourable to the Carthaginians; who were bound by them, 1. To quit Sicily entirely, and all the Italian iſlands: 2. To pay the Romans 2200 talents of ſilver, (or L. 437,250,) at equal payments within 10 years, and 1000 talents immediately: 3. To reſtore the Roman captives and deſerters without ranſom; and to pay for their own: and, 4. Not to make war upon king Hiero or his allies. The Carthaginians were no ſooner got out of this bloody and expenſive war, than they found themſelver engaged in another, which had almoſt proved fatal to them. It is called by ancient hiſtorians the *Libyan war*, or the *war with the mercenaries*. The principal occaſion of it was, that when Hamilcar returned to Carthage, he found the republic ſo much impoveriſhed, that, inſtead of being able to give theſe troops the rewards promiſed them, it could not pay them their arrears. He had committed the care of tranſporting them to one GISCO, who, being an officer of great penetration, did not ſhip them off all at once, but in ſmall parties, that thoſe who came firſt might be paid off and ſent home before the arrival of the reſt. The Carthaginians at home, however, did not act with the ſame prudence. As the ſtate finances were almoſt entirely exhauſted by the war, they wiſhed to ſave ſomething to the public. They did not therefore pay off the mercenaries as they arrived, but waited till they all came together, with a view of obtaining ſome remiſſion of their arrears. But being ſoon convinced of their error, by the diſorders theſe barbarians committed in the city, they prevailed upon the officers to take up their quarters at Sicca, and canton their troops in that neighbourhood, giving them money for preſent ſubſiſtence, and promiſing to comply with their pretenſions, when the remaining troops arrived from Sicily. Here they determined not to accept of bare pay, but to inſiſt upon the rewards Hamilcar had promiſed them, and even to compel the ſtate of Carthage to comply by force of arms. The ſenate, being informed of the mutinous diſpoſition of the ſoldiery, diſpatched Hanno, one of the ſuffetes, to pacify them. Upon his arrival at Sicca, he expatiated largely upon the poverty of the ſtate, and the heavy taxes with which the citizens of Carthage were loaded; and therefore deſired them to be ſatisfied with part of their pay, and remit the remainder to ſerve the preſſing exigencies of the republic. The mercenaries being highly provoked, that neither Hamilcar, nor any other of the principal officers who commanded them in Sicily, and were the beſt judges of their merit, made their appearance on this occaſion, immediately had recourſe to arms. Aſſembling in a body of 20,000, they advanced to Tunis, and encamped before that city. The Carthaginians, alarmed at their approach to Tunis, made large conceſſions, to bring them back to their duty: but, far from being ſoftened, they grew more inſolent, and became quite averſe to accommodation. The Carthaginians, making a virtue of neceſſity, ſhowed a diſpoſition to ſatisfy them in all points, and agreed to refer the matter to the opinion of ſome general in Sicily, leaving the choice of him entirely to themſelves. Giſco was accordingly pitched upon to mediate this affair. He ſoon arrived at Tunis with money to pay the troops; and after conferring with the officers of the ſeveral nations apart, he harangued them in ſuch a manner, that a treaty was upon the point of being concluded, when Spendius and Mathos, two of the principal mutineers, occaſioned a tumult in every part of the camp. Spendius was by nation a Campanian, who had been a ſlave at Rome, and had fled to the Carthaginians. The fear of being delivered to his old maſter, by whom he was ſure to be hanged or crucified, prompted him to break off the accommodation. Mathos was an African, and free born; but as he had been active in raiſing the rebellion, and knew the implacable diſpoſition of the Carthaginians, he was ſure that a peace muſt prove his ruin. He therefore joined with Spendius, and inſinuated to the Africans the danger of concluding a treaty at that juncture, which could not but leave them ſingly expoſed to the rage of the Carthaginians. This incenſed the Africans, who were much more numerous than the troops of any other nation. The foreigners were inſpired by Spendius with an equal degree of fury. Nothing was now to be heard but the moſt horrid imprecations againſt Giſco and the Carthaginians. Whoever offered to propoſe temperate meaſures was ſtoned to death by the enraged multitude. Some even loſt their lives merely for attempting to ſpeak, before it could be known whether they were in the intereſt of Spendius or the Carthaginians. In the midſt of theſe commotions, Giſco behaved with great intrepidity. He left no method untried to calm the minds of the ſoldiery; but the torrent of ſedition was now ſo ſtrong, that there was no poſſibility of keeping it within bounds. They ſeized upon the military cheſt, divided the money, put Giſco under an arreſt, and treated him and his attendants with the utmoſt indignity. Mathos and Spendius, to deſtroy the remoteſt hopes of an accommodation with Carthage, applauded the courage and reſolution of their men, loaded Giſco and his followers with irons, and declared war againſt the Carthaginians. All the cities of Africa to whom they had ſent deputies to exhort them to recover their liberty, came over to them, except Utica and Hippo Diarhytus. Their army being thus greatly increaſed, they divided it into two parts, with one of which they moved towards Utica, whilſt the other marched to Hippo to beſiege both places. The Carthaginians were now ready to ſink under their misfortunes. After they had been haraſſed 24 years by a moſt deſtructive foreign war, they had hoped to enjoy repoſe. The citizens of Carthage drew their private ſubſiſtence from the rents of their lands, and the public expences from the tribute paid from Africa; all which they were not only deprived of at once, but found employed againſt them. They were deſtitute of arms and forces by ſea and land; and had made no preparations for ſuſtaining a ſiege, or equipping a fleet. They ſuffered all the calamities incident to the moſt ruinous civil war; and, to complete their miſery, had no proſpect of aſſiſtance from any foreign ally. They did not, however, deſpond, but adopted every prudent meaſure of defence. Hanno was appointed commander in chief, and the moſt ſtrenuous efforts were made, to repel the attempts of the mutineers, and reduce them by force of arms. In the mean time Mathos and Spendius laid ſiege to Utica and Hippacra; but as they were carried on by detachments drawn from the army for that purpoſe, they remained with the main-body of their forces at Tunis, and thereby cut off all communication betwixt Carthage and the continent of Africa. The capital, was thus kept in a kind of blockade. The Africans likewiſe haraſſed them by perpetual alarms advancing to the very walls of Carthage, and treating with the utmoſt cruelty every Carthaginian that fell into their hands. Hanno was diſpatched to the relief of Utica with a large body of forces, 100 elephants, and a train of battering engines. He immediately attacked their intrenchments, and after an obſtinate diſpute, forced them. The mercenaries loſt a vaſt number of men; and the advantages gained by Hanno were ſo great, that they might have proved deciſive, and he improved them: But becoming ſecure after his victory the mercenaries, having rallied their forces, fell upon him, cut off many of his men, forced, the reſt to fly into the town, retook and plundered the camp, and ſeized all the proviſions, military ſtores, &c. brought to the relief of the beſieged. Nor was this the only inſtance of Hanno's military incapacity. Though he lay encamped moſt advantageouſly, near Gorza, where he twice overthrew the enemy, and might have totally ruined them, he neglected thoſe advantages, and ſuffered the mercenaries to take poſſeſſion of the iſthmus, which joined the peninſula on which Carthage ſtood, to the continent of Africa. The Carthaginians, therefore, once more placed Hamilcar Barcas at the head of their forces. He marched againſt the enemy with 10,000 men, horſe and foot; being all the troops the Carthaginians could then aſſemble, a full proof of the low ſtate to which they were then reduced. As Mathos, after he had poſſeſſed himſelf of the iſthmus, had poſted proper detachments in two paſſes on two hills facing the continent, and guarded the bridge over the Bagrada, Hamilcar ſaw little probability of engaging him upon equal terms, or indeed of coming at him. Obſerving, however, that on the blowing of certain winds the mouth of the river was choaked up with ſand, ſo as to become paſſable, as long as theſe winds continued, he halted for ſome time at the river's mouth, without communicating his deſign to any perſon. As ſoon as the wind favoured his project, he paſſed the river by night, and immediately after drew up the troops in order of battle, and advancing into the plain where his elephants were capable of acting, moved towards Mathos, who was poſted at the village near the bridge. This daring action greatly ſurpriſed and intimidated the Africans. However, Spendius, receiving intelligence of the enemy's motions, drew a body of 10,000 men out of Mathos's camp, with which he attended Hamlicar on one ſide, and ordered 15,000 from Utica to obſerve him on the other, thinking to ſurround the Carthaginians, and cut them all off at once. By feigning a retreat, Hamilcar found means to engage them at a diſadvantage; and gave them a total overthrow with the loſs of 6000 killed and 2000 taken priſoners. The reſt fled, ſome to the town at the bridge, and others to the camp at Utica. He did not give them time to recover, but purſued them to the town near the bridge, which he entered without oppoſition, the mercenaries flying in great confuſion to Tunis; and upon this many towns ſubmitted voluntarily to the Carthaginians, whilſt others were reduced by force. Notwithſtanding theſe diſaſters, Mathos puſhed on the ſiege of Hippo with vigour, and appointed Spendius and Autaritas, commanders of the Gauls, with a ſtrong body, to obſerve the motions of Hamilcar. Theſe two commanders, at the head of a detachment of 6000 men, from the camp at Tunis, and 2000 Gallic horſe, attended the Cathaginian general, approaching him as near as they could with ſafety, and keeping cloſe to the ſkirts of the mountains. At laſt Spendius, having received a ſtrong reinforcement of Africans and Numidians, and ſeizing all the heights around the plain in which Hamilcar lay encamped, reſolved not to loſe ſo favourable an opportunity of attacking him. Had a battle now enſued, Hamilcar and his army muſt in all probability have been cut off; but by the deſertion of one Naravaſus, a young Numidian nobleman, with 2000 men, he found himſelf enabled to offer his enemies battle. The fight was obſtinate and bloody; but at laſt the mercenaries were entirely overthrown, with the loſs of 10,000 men killed and 4000 taken priſoners. All the priſoners that were willing to inliſt in the Carthaginian ſervice, Hamilcar received among his troops, ſupplying them with the arms of the ſoldiers who had fallen in the engagement. To the reſt he gave liberty to go where they pleaſed, upon condition that they ſhould never again bear arms againſt the Carthaginians. Mathos and his aſſociates, fearing that this lenity of Hamilcar might occaſion a defection among their troops, thought that the beſt expedient would be to put them upon ſome action ſo execrable in its nature, that no hopes of reconciliation might remain. By their advice, therefore, Giſco and all the Carthaginian priſoners were put to death; and when Hamilcar ſent to demand the remains of his countrymen, he received for anſwer, that whoever preſumed hereafter to come upon that errand, ſhould meet with Giſco's fate; after which they reſolved to treat with the ſame barbarity all ſuch Carthaginians as ſhould fall into their hands. In revenge for this enormity, Hamilcar threw all the priſoners that fell into his hands to be devoured by wild beaſts; being convinced that compaſſion ſerved only to make his enemies more fierce and untractable. Although the war was now carried on generally to the advantage of the Carthaginians; yet the malecontents were ſtill able to take the field with 50,000 men. They watched Hamilcar's motions, but kept on the hills, carefully avoiding to come down into the plains, on account of the Numidian horſe and Carthaginian elephants. Hamilcar, being much ſuperior in ſkill to any of their generals, at laſt ſhut them up in a poſt ſo ſituated that it was impoſſible to get out of it. Here he kept them ſtrictly beſieged: and the mercenaries, not daring to venture a battle, began to fortify their camp, and ſurround it with ditches and intrenchments. They were ſoon ſo hard preſſed by famine, that they were obliged to eat one another; but they were driven deſperate by the conſciouſneſs of their guilt. At laſt, being reduced to the utmoſt extremity of miſery, they inſiſted that Spendius, Autaritus, and Zarxas, their leaders, ſhould have a perſonal conference with Hamilcar, and make propoſals to him. Peace was accordingly concluded upon the followiug terms *viz.* That ten of the ringleaders ſhould be left entirely to the mercy of the Carthaginians; and that the troops ſhould all be diſarmed, every man retiring only in a ſingle coat. The treaty was no ſooner concluded, than Hamilcar, by virtue of the firſt article, ſeized upon the negociators themſelves, and the army being informed that their chiefs were under arreſt, had immediately recourſe to arms, as ſuſpecting they were betrayed; but Hamilcar, drawing out his army in order of battle, ſurrounded them and either cut them to pieces, or trod them to death with his elephants. The number of wretches who periſhed on this occaſion amounted to above 40,000. Hamilcar next inveſted Tunis, whither Mathos had retired with all his remaining forces. Hannibal, another general, was joined in the command with Hamilcar. Hannibal's quarter was on the road leading to Carthage, and Hamilcar's on the oppoſite ſide. The army was no ſooner encamped, than Hamilcar cauſed Spendius, and the reſt of the priſoners, to be led out in the view of the beſieged, and crucified near the walls. Mathos, however, obſerving that Hannibal did not keep a good guard, ſallied out, attacked his quarters, killed many of his men, took ſeveral priſoners, among whom was Hannibal himſelf, and plundered his camp. Taking the body of Spendius from the croſs, Mathos immediately ſubſtituted Hannibal in its room; and 30 Carthaginian priſoners of diſtinction were crucified around him. Upon this diſaſter, Hamilcar immediately decamped, and poſted himſelf along the ſea-coaſt, near the mouth of the Bagrada. The ſenate, though greatly terrified by this unexpected blow, omitted no means neceſſary for their preſervation. They ſent 30 ſenators, with Hanno at their head, to conſult with Hamilcar about the proper meaſures for putting an end to this unnatural war, conjuring, in the moſt preſſing manner, Hanno to be reconciled to Hamilcar, and to ſacrifice his private reſentment to the public benefit. This, with ſome difficulty, was effected: and the two generals came to a full reſolution to act in concert for the good of the public. The ſenate, at the ſame time, ordered all the youth capable of bearing arms to be preſſed into the ſervice; by which means a ſtrong reinforcement being ſent to Hamilcar, he ſoon found himſelf in a condition to act offenſively. He now defeated the enemy in all rencounters, drew Mathos into frequent ambuſcades, and gave him a notable overthrow near Leptis. This reduced the rebels to the neceſſity of hazarding a deciſive battle, which proved fatal to them. The mercenaries fled almoſt at the firſt onſet; moſt of their army fell in the field of battle, or in the purſuit. Mathos, with a few, eſcaped to a neighbouring town, where he was taken, carried to Carthage, and executed; and then, by the reduction of the revolted cities, an end was put to this war, which, from the exceſſes of cruelty committed in it, according to Polybius, went among the Greeks by the name of the INEXPIABLE WAR.—During the Lybian war, the Romans, upon ſome abſurd pretences, wreſted the iſland of Sardinia from the Carthaginians; which the latter, not being able to reſiſt, were obliged to ſubmit to. Hamilcar finding his country not in a condition to enter into an immediate war with Rome, formed a ſcheme to put it on a level with that haughty republic. This was by making an entire conqueſt of Spain, by which means the Carthaginians might have troops capable of coping with the Romans. In order to facilitate the execution of this ſcheme, he inſpired both his ſon-in-law Aſdrubal, and his ſon Hannibal, with an implacable averſion to the Romans, as the great oppoſers of his country's grandeur.—Having completed all the neceſſary preparations, Hamilcar, after having greatly enlarged the Carthaginian dominions in Africa, entered Spain, where he commanded 9 years, during which he ſubdued many warlike nations, and amaſſed an immenſe quantity of treaſure, which he diſtributed partly amongſt his troops, and partly amongſt the great men at Carthage; by which means he ſupported his intereſts with theſe two powerful bodies. At laſt he was killed in a battle, and was ſucceeded by his ſon-in-law Aſdrubal. This general fully anſwered the expectations of his countrymen; greatly enlarged their dominions in Spain; and built the city of New Carthage, now CARTHAGENA. He made ſuch progreſs in his conqueſts, that the Romans began to grow jealous. They did not, however, chooſe at preſent to come to an open rupture, on account of the apprehenſions they were under of an invaſion from the Gauls. They judged it moſt proper, therefore, to have recourſe to milder methods; and prevailed upon Aſdrubal to conclude a new treaty with them. The articles were, 1. That the Carthaginians ſhould not paſs the Iberus. 2. That the Saguntines, a colony of Zacynthians, and a city ſituated between the Iberus and that part of Spain ſubject to the Carthaginians, as well as the other Greek colonies there, ſhould enjoy their ancient rights and privileges. Aſdrubal, after having governed the Carthaginian dominions in Spain for 8 years, was treacherouſly murdered by a Gaul whoſe maſter he had put to death. He had written to Carthage 3 years before, deſiring that young Hannibal then 22 years of age, might be ſent to him. This requeſt was complied with, notwithſtanding the oppoſition of Hanno; and from Hannibal's firſt arrival in the camp, he became the darling of the whole army. The great reſemblance he bore to Hamilcar, rendered him extremely agreeable to the troops. He ſeemed to poſſeſs every qualification that can contribute towards forming a great man. After the death of Aſdrubal, he was ſaluted general by the army with the higheſt demonſtrations of joy. In the firſt campaign, he conquered the Olcades, a nation ſeated near the Iberus. Next year he ſubdued the Vaccæi, another nation in that neighbourhood. Soon after, the Carpætani, one of the moſt powerful nations in Spain, declared againſt the Carthaginians. Their army conſiſted of 100,000 men, with which they propoſed to attack Hannibal on his return from the Vaccæi; but by ſtratagem they were utterly defeated, and the nation obliged to ſubmit. Nothing now remained to oppoſe the progreſs of the Carthaginian arms, but the city of Saguntum. Hannibal, for ſome time, did not think proper to come to a rupture with the Romans by attacking that place. At laſt he found means to embroil ſome of the neighbouring cantons, eſpecially the Turdetani, with the Saguntines, and thus furniſhed himſelf with a pretence to attack their city. Upon the commencement of the ſiege, the Roman ſenate diſpatched two ambaſſadors to Hannibal, with orders to proceed to Carthage, in caſe the general refuſed to give them ſatisfaction. They were ſcarce landed, when Hannibal, who was carrying on the ſiege of Saguntum with great vigour, ſent them word that he had ſomething elſe to do than to give audience to ambaſſadors. At laſt, however, he admitted them; and in anſwer to their remonſtrances, told them, that the Saguntines had drawn their misfortunes upon themſelves, by committing hoſtilities againſt the allies of Carthage; and at the ſame time deſired the deputies, if they had any complaints to make of him, to carry them to the ſenate of Carthage. On their arrival in that capital, they demanded that Hannibal might be delivered up to the Romans, to be puniſhed according to his deſerts; and this not being complied with, war was immediately declared between the two republics. The Saguntines defended themſelves for 8 months with incredible bravery; but at laſt, their city was taken, and the inhabitants were treated with the utmoſt cruelty. After this Hannibal put his African troops into winter quarters at New Carthage; but in order to gain their affection, he permitted the Spaniards to retire to their reſpective homes.

(6.) CARTHAGE, HISTORY OF, TO ITS UTTER DESTRUCTION. Hannibal, having taken meaſures for ſecuring Africa and Spain, paſſed the Iberus, ſubdued all the nations betwixt that river and the Pyrenees, appointed Hanno commander of all the new conquered diſtricts, and immediately began his march for Italy. Upon muſtering his forces, after they had been weakened by ſieges, deſertion, mortality, and a detachment of 10,000 foot and 1000 horſe left with Hanno to ſupport him in his new poſt, he found them to amount to 50,000 foot and 9000 horſe, all veteran troops, and the beſt in the world. As they had left their heavy baggage with Hanno, and were all light armed, Hannibal eaſily croſſed the Pyrenees; paſſed by Ruſcino, a frontier town of the Gauls; and arrived on the banks of the Rhone without oppoſition. But in paſſing this river, he met with ſome oppoſition from the Gauls; and was for ſome time in doubt whether he ſhould advance to engage the Romans, who, under Scipio, were marching that way, or continue his march for Italy. To the latter he was ſoon determined by the arrival of Magilus prince of the Boii, who brought rich preſents, and offered to conduct the Carthaginian army over the Alps. Nothing could have happened more favourable to Hannibal's affairs, as there was no room to doubt the ſincerity of this prince. For the Boii bore an implacable enmity to the Romans, and had even come to an open rupture with them, upon the firſt news that Italy was threatened with an invaſion from the Carthaginians. It is not known with certainty where Hannibal began to aſcend the Alps. As ſoon as he began his march, the petty kings of the country aſſembled their forces in great numbers; and taking poſſeſſion of the eminences over which the Carthaginians muſt neceſſarily paſs, they continued haraſſing them, and were no ſooner driven from one eminence than they ſeized on another, diſputing every foot of land with the enemy, and deſtroying great numbers of them by the advantage they had of the ground. Hannibal, however, having ſeized an advantageous poſt, defeated and diſperſed the enemy; and ſoon after took their capital city, where he found the priſoners, horſes, &c. that had before fallen into their hands, with corn ſufficient to ſerve the army for 3 days. At laſt, after a moſt fatiguing march of 9 days, he arrived at the top of the mountains. Here he encamped, and halted two days, to give his wearied troops ſome repoſe, and to wait for the ſtragglers. The ſight of the ſnow covering the ground terrified

fied the Africans and Spaniards, who were much affected with the cold. To encourage them Hannibal led them to the top of the higheſt rock on the ſide of Italy, and gave them a view of the fruitful plains of Inſubria, acquainting them that the Gauls, whoſe country they ſaw, were ready to join them. He alſo pointed out the place whereabout Rome ſtood, telling them, that by climbing the Alps, they had ſcaled the walls of that rich metropolis; and having thus animated his troops, he decamped and began to deſcend. The difficulties they met with in their deſcent were much greater than thoſe that had occurred in their aſcent. They had indeed no enemy to contend with, except ſome ſcattered parties that came to ſteal rather than to fight; but the deep ſnows, the mountains of ice, craggy rocks, and frightful precipices, appeared more terrible than any army. After they had for ſome days marched through narrow, ſteep, and ſlippery paths, they came to a place which neither elephants, horſes, nor men, could paſs. The way, which lay between two precipices, was exceedingly narrow; and the declivity, which was very ſteep, had become more dangerous by the falling away of the earth. Here the guides ſtopped; and the whole army being terrified, Hannibal propoſed at firſt to march round about, and attempt ſome other way: but all places round him being covered with ſnow, he found himſelf under the neceſſity of cutting a way through the rock itſelf. This was accompliſhed with incredible labour; and Hannibal, having ſpent 9 days in aſcending, and ſix in deſcending, the Alps, at laſt reached Inſubria; and notwithſtanding all the diſaſters he had met with by the way, entered the country with all the boldneſs of a conqueror. Upon reviewing his army, he found, that of the 50,000 foot with whom he ſet out from New Carthage 5 months and 15 days before, he had now only 20,000, and that his 9000 horſe were reduced to 6000. His firſt care after he entered Italy, was to refreſh his troops; who, after ſo long a march, and ſuch inexpreſſible hardſhips, looked like ſo many ſkeletons raiſed from the dead. He did not, however, ſuffer them to languiſh in idleneſs; but, joining the Inſubrians, who were at war with the Taurinians, laid ſiege to Taurinum, the only city in that country, and in 3 days became maſter of it, putting all who reſiſted to the ſword. This ſtruck the neighbouring nations with ſuch terror, that they voluntarily ſubmitted to the conqueror, and ſupplied his army with all ſorts of proviſions.—Having thus brought our Carthiginian hero to the borders of the Roman territories, we refer the reader for an account of his repeated and aſtoniſhing victories, as well as his ultimate defeats, during the 2d Punic war, (which was chiefly carried on in *Italy*) to the HISTORY OF ROME: and ſhall haſten to relate the accumulated diſtreſſes and final cataſtrophe of his country, which that hero exerted himſelf ſo much to prevent. Indeed if the uncommon wiſdom, bravery, abilities and military experience of any individual, could have ſaved that ſtate, and overthrown its rival, Hannibal was the man in whom theſe qualifications were united in an extraordinary degree. But the infatuation of his countrymen, in not ſupporting him with timeous ſupplies, when he had reduced the Romans to the utmoſt diſtreſs, (inſomuch that they were even neceſſitated to devote their jewels to the public finances, and to recruit their forces from among their ſlaves,) loſt them the opportunity of cruſhing that tyrannical republic, and ultimately led to the total deſtruction of their own ſtate. After a tedious and expenſive war of 14 years the Carthaginians were obliged to ſubmit to the following very humiliating terms of peace viz. 1. To deliver up all the Roman deſerters fugitive ſlaves, priſoners, and all the Italians whom Hannibal had obliged to follow him: 2. To give up all their ſhips of war except ten triremes, with all their tame elephants, and to train up no more of theſe animals for war: 3. Not to engage in any war without the conſent of the Romans: 4. To pay to the Romans, in 50 years, 10,000 Euboic talents, at equal payments: 5. To reſtore to Maſiniſſa all that they had uſurped from him or his anceſtors, and to enter into an alliance with him: 6. To aſſiſt the Romans both by ſea and land, when called upon: and 7. Never to make any levies either in Gaul or Liguria. Theſe terms appeared ſo intolerable to the populace, that they threatened to burn the houſes of the nobility; but Hannibal having aſſembled 600 foot and 500 horſe at Marthama, prevented an inſurrection, and by his influence completed the accommodation. Theſe terms of peace, however, were ſcarce ſigned, when Maſiniſſa unjuſtly ſeized, part of the Carthagnian dominions in Africa, pretending that they formerly belonged to his family. The Carthaginians, through the villainous mediation of the Romans, found themſelves under a neceſſity of ceding theſe countries to that ambitious prince, and of entering into an alliance with him. A good underſtanding between the two powers continued for ſeveral years afterwards. After the peace, Hannibal ſtill kept up his credit among his countrymen. He was intruſted with the command of an army againſt ſome neighbouring nations in Africa; but this being diſagreeable to the Romans, he was removed from it, and raiſed to the dignity of prætor in Carthage. Here he continued for ſome time, reforming abuſes, and putting the affairs of the republic into a better condition; but this likewiſe being diſagreeable to the Romans, he was obliged to fly to Antiochus king of Syria. Even after his flight, the Romans ſtill looked upon the Carthaginians with a ſuſpicious eye; though, to prevent every thing of this kind, the latter had ordered 2 ſhips to purſue Hannibal, had confiſcated his effects, raſed his houſe, and by a public decree declared him an exile. Soon after, diſputes ariſing between the Carthaginians and Maſiniſſa, the latter, notwithſtanding the manifeſt iniquity of his proceedings, was ſupported by the Romans. That prince, graſping at farther conqueſts, endeavoured to embroil the Carthaginians with the Romans, by aſſerting that the former had received ambaſſadors from Perſeus king of Macedon; that the ſenate aſſembled in the temple of Æſculapius in the night, in order to confer with them; and that ambaſſadors had been diſpatched from Carthage to Perſeus, to conclude an alliance with him. Not long after this, Maſiniſſa made an irruption into the province of Tyſca, where he ſeized 50, or as ſome ſay 70 towns and caſtles. This obliged the Carthaginians to apply with great importunity to the Roman ſenate for redreſs, their hands being ſo tied up by an article in the laſt treaty, that they could not repel force by force, in caſe of an invaſion, without their conſent. Their ambaſſadors begged, that the Roman ſenate would ſettle once for all what dominions they were to have, that they might know what they had to depend upon; or if their ſtate had offended the Romans, they begged that they would puniſh them themſelves, rather than leave them expoſed to the inſults and vexations of ſo mercileſs a tyrant. Then proſtrating themſelves on the earth, they burſt into tears. Notwithſtanding the impreſſion their ſpeech made, the matter was left undecided; ſo that Maſiniſſa had liberty to purſue his rapines as much as he pleaſed. But whatever villainous deſigns the Romans might have with regard to the republic of Carthage, they affected to ſhow a great regard to the principles of juſtice and honour. They therefore ſent Cato, a man famous for committing the greateſt enormities under the ſpecious pretence of public ſpirit, into Africa, to accommodate all differences betwixt Maſiniſſa and the Carthaginians. The latter very well knew their fate, had they ſubmitted to ſuch a mediation; and therefore appealed to the treaty concluded with Scipio, as the only rule to which their conduct and that of their adverſary ought to be examined. This reaſonable appeal ſo incenſed the *righteous* Cato, that he pronounced them a devoted people, and from that time reſolved upon their deſtruction. For ſome time he was oppoſed by Scipio Naſica; but the people of Carthage, knowing the Romans to be their inveterate enemies, and reflecting upon the iniquitous treatment they had met with from them ever ſince the commencement of their diſputes with Maſiniſſa, were under great apprehenſions of a viſit from them. To prevent a rupture as much as poſſible, by a decree of the ſenate, they impeached Aſdrubal general of the army, and Carthalo, commander of the auxiliary forces, with their accomplices, as guilty of high treaſon, for being the authors of the war againſt the king of Numidia. They ſent a deputation to Rome, to diſcover what ſentiments were entertained there of their late conduct, and to know what ſatisfaction the Romans required. Theſe meſſengers meeting with a cold reception, others were diſpatched, who returned with the ſame ſucceſs. This made the unhappy citizens of Carthage believe that their deſtruction was reſolved upon; which threw them into the utmoſt deſpair. And indeed they had but too juſt grounds for ſuch a melancholy apprehenſion, the Roman ſenate now diſcovering an inclination to fall in with Cato's bloody meaſure. About the ſame time, the city of Utica, being the ſecond in Africa, and famous for its immenſe riches, as well as its equally commodious and capacious port, ſubmitted to the Romans. Upon the poſſeſſion of ſo important a fortreſs, which by reaſon of its vicinity to Carthage, might ſerve as a place of arms in the attack of that city, the Romans declared war againſt the Carthaginians; and diſpatched the conſuls M. Manlius Nepos, and L. Marcius Cenſorinus, with an army and fleet to begin hoſtilities with the utmoſt expedition. The land forces conſiſted of 80,000 foot and 4000 choſen horſe; and the fleet of 50 quinqueremes, beſides a vaſt number of tranſports. The conſuls had ſecret orders from the ſenate, not to conclude the operations but by the deſtruction of Carthage, without which, it was pretended, the republic could not but look upon all her poſſeſſions as inſecure. The troops landed at Lilybæum in Sicily, from whence after receiving a proper refreſhment, it was propoſed to tranſport them to Utica. The anſwer brought by the laſt ambaſſadors to Carthage had not a little alarmed the inhabitants of that city. But they were not yet acquainted with the reſolutions taken at Rome. They therefore ſent freſh ambaſſadors thither, whom they inveſted with full powers to act as they thought proper for the good of the republic, and even to ſubmit without reſerve to the pleaſure of the Romans. But the moſt ſenſible perſons among them did not expect any great ſucceſs from this condeſcenſion, ſince the early ſubmiſſion of the Uticans had rendered it infinitely leſs meritorious than it would have been before. However, the Romans ſeemed to be in ſome meaſure ſatisfied with it, ſince they promiſed them their liberty, the enjoyment of their laws, and in ſhort every thing that is dear and valuable to them. This threw them into a tranſport of joy, and they wanted words to extol the moderation of the Romans. But the ſenate immediately daſhed all their hopes, by acquainting them, that this favour was granted upon condition that they would ſend 300 young Carthaginian noblemen of the firſt diſtinction to the prætor Fabius at Lilybæum, within the ſpace of 30 days, and comply with all the orders of the conſuls. Theſe hard terms filled the whole city with inexpreſſible grief: but the hoſtages were delivered; and as they arrived at Lilybæum before the 30 days were expired, the ambaſſadors were not without hopes of ſoftening their hard-hearted enemy. But the conſuls only told them, that upon their arrival at Utica, they ſhould learn the farther orders of the republic. The miniſters no ſooner received intelligence of the Roman fleet appearing off Utica, than they repaired thither, in order to know the fate of their city. The conſuls however, did not judge it expedient to communicate all the commands of their republic at once, leſt they ſhould appear ſo harſh and ſevere, that the Carthaginians would have refuſed to comply with them. They firſt, therefore, demanded a ſufficient ſupply of corn for the ſubſiſtence of their troops. 2. That they ſhould deliver up into their hands all the triremes they were then maſters of. 3. That they ſhould put them in poſſeſſion of all their military machines. And 4. That they ſhould immediately convey all their arms into the Roman camp. As care was taken that there ſhould be a convenient interval of time betwixt every one of theſe demands, the Carthaginians found themſelves enſnared, and could not reject any one of them, though they ſubmitted to the laſt with the utmoſt reluctance. Cenſorinus, now imagining them incapable of ſuſtaining a ſiege, commanded them to abandon their city, or as Zonaras has it, to demoliſh it; permitting them to build another 80 ſtadia from the ſea, but without walls or fortifications. This terrible decree threw the ſenate and every one elſe into deſpair; and the whole city became a ſcene of horror, madneſs, and confuſion. The citizens curſed their anceſtors for not dying glorioſly in the defence of their country, rather than concluding thoſe ignominious treaties of peace, that had been the cauſe of the deplorable condition to which their poſterity were now reduced. At length, when the firſt commotion was a little abated, the ſenators aſſembled, and reſolved to ſuſtain a ſiege. They were ſtripped of their arms and deſtitute of proviſions; but deſpair raiſed their courage, and made them find out expedients. They took care to ſhut the gates of the city; and gathered together on the ramparts great heaps of ſtones, to ſerve them inſtead of arms in caſe of a ſurpriſe. They took the malefactors out of priſon, gave the ſlaves their liberty, and incorporated them in the militia. Aſdrubal was recalled, who had been ſentenced to die only to pleaſe the Romans; and he was invited to employ the 20,000 men he had raiſed againſt his country, in defence of it. Another Aſdrubal was appointed to command in Carthage; and all ſeemed reſolute, either to ſave their city or periſh in its ruins. They wanted arms; but, by order of the ſenate, the temples, porticoes, and all the public buildings, were converted into workhouſes, where men and women were continually employed in making arms. As they encouraged one another in their work, and loſt no time in procuring to themſelves the neceſſaries of life, which were brought to them at ſtated hours, they every day made 144 bucklers, 300 ſwords, 1000 darts, and 500 lances and javelins. As to baliſtæ and catapultæ, they wanted proper materials for them; but their induſtry ſupplied that defect. Where iron and braſs were wanting, they made uſe of ſilver and gold, melting down the ſtatues, vaſes, and even the utenſils of private families; for, on this occaſion, even the moſt covetous became liberal. As tow and flax were wanting to make cords for working the machines, the women, even thoſe of the firſt rank, freely cut off their hair, and dedicated it to that uſe. Without the walls, Aſdrubal employed troops in getting together proviſions, and conveying them ſafe into Carthage; ſo that there was as great plenty there as in the Roman camp. In the mean time the conſuls delayed drawing near to Carthage, not doubting but the inhabitants, whom they imagined deſtitute of neceſſaries to ſuſtain a ſiege, would, upon reflection, ſubmit; but at length, finding their expectations wrong, they came before the place and inveſted it. As they were ſtill perſuaded that the Carthaginians had no arms, they flattered themſelves that they ſhould eaſily carry the city by aſſault. Accordingly they approached the walls in order to plant their ſcaling ladders; but to their great ſurpriſe they diſcovered a prodigious multitude of men on the ramparts, ſhining in the armour they had newly made. The legionaries were ſo terrified at this ſight, that they drew back, and would have retired, if the conſuls had not led them on to the attack: which, however, proved unſucceſsful; the Romans, in ſpite of their utmoſt efforts, being obliged to give over the enterprize. In the mean time Aſdrubal having collected from all places ſubject to Carthage a prodigious number of troops, came and encamped within reach of the Romans, and ſoon reduced them to great ſtraits for want of proviſions. As Marcius, one of the Roman conſuls, was poſted near a marſh, the exhalations of the ſtagnating waters, and the heat of the ſeaſon, infected the air, and cauſed a general ſickneſs among his men. Marcius, therefore, ordered his fleet to draw as near the ſhore as poſſible, in order to tranſport his troops to an healthier place. Aſdrubal being informed of this motion, ordered all the old barks in the harbour to be filled with faggots, tow, ſulphur, bitumen, and other combuſtible materials; and then taking advantage of the wind, which blew towards the enemy, let them drive upon their ſhips, which were for the moſt part conſumed. After this diſaſter, Marcius was called home to preſide at the elections; and the Carthaginians looking upon the abſence of one of the conſuls to be a good omen, made a briſk ſally in the night; and would have ſurpriſed the conſul's camp, had not Æmilianus, with ſome ſquadrons, marched out of the gate oppoſite to the place where the attack was made, and, coming round, fallen unexpectedly on their rear, and obliged them to return in diſorder to the city. Aſdrubal had poſted himſelf under the walls of Nepheris, a city 24 miles from Carthage, ſituated on a high mountain, which ſeemed inacceſſible on all ſides. From thence he made incurſions into the neighbouring country, intercepted the Roman convoys, fell upon their detachments ſent out to forage, and even ventured to inſult the conſular army in their camp. Hereupon the conſul reſolved to drive the Carthaginians from this advantageous poſt, and ſet out for Nepheris. As he drew near the hills, Aſdrubal ſuddenly appeared at the head of his army in order of battle, and fell upon the Romans with incredible fury. The conſulary army ſuſtained the attack with good reſolution; and Aſdrubal retired in great order to his poſt, hoping the Romans would attack him there. But the conſul being now convinced of his danger, reſolved to retire. This Aſdrubal no ſooner perceived, than he ruſhed down the hill, and falling upon the enemy's rear, cut a great number of them in pieces. The whole Roman army would now have been deſtroyed, had not Scipio Æmilanus, at the head of 300 horſe, ſuſtained the attack of all Aſdrubal's forces, and covered the legions; while they paſſed a river in their retreat. Then he and his companions threw themſelves into the ſtream and ſwam acroſs it. When the army had croſſed the river, it was perceived that four manipuli were wanting; and ſoon after they were informed that they had retired to an eminence, where they reſolved to ſell their lives as dear as poſſible. Upon this news, Æmilianus, taking with him a choſen body of horſe, and proviſions for two days, croſſed the river, and flew to the aſſiſtance of his countrymen. He ſeized an hill over againſt that on which the four manipuli were poſted: and, after ſome hours repoſe, marched againſt the Carthaginians who kept them inveſted, fell upon them at the head of his ſquadron with the boldneſs of a man determined to conquer or die, and in ſpite of all oppoſition opened a way for his fellow ſoldiers to eſcape. On his return to the army, his companions, who had given him over for loſt, carried him to his quarters in a kind of triumph; and the manipuli he had ſaved gave him a crown of *gramen*. By theſe and ſome other exploits, Æmilianus gained ſuch reputation, that Cato, who is ſaid never to have commended any body before, could not refuſe him the praiſes he deſerved; and is ſaid to have foretold, that Carthage would never be reduced, till Scipio Æmilianus was employed in that expedition. The next year, the war in Africa fell by lot to the conſul L. Calpurnius Piſo; and he continued to employ Æmilianus in ſeveral important enterpriſes, in which he was attended with uncommon ſucceſs. He took ſeveral caſtles; and in one of his excurſions, had a private conference with Phameas, general, under Aſdrubal, of the Carthaginian cavalry, and brought him over, together with 2200 of his horſe, to the Roman intereſt. Under the conſul Calpurnius Piſo himſelf, however, the Roman arms were unſucceſſful. He inveſted Clupea; but was obliged to abandon the enterpriſe, with the loſs of a great number of men killed by the enemy in their ſallies. From this place he went to vent his rage on a city newly built, and thence called NEAPOLIS, which profeſſed a ſtrict neutrality, and had even a ſafeguard from the Romans. The conſul, however, plundered the place, and ſtripped the inhabitants of all their effects. After this, he laid ſiege to HIPPAGRETA, which employed the Roman fleet and army the whole ſummer; and, on the approach of winter, the conſul retired to Utica, without performing a ſingle action worth notice during the whole campaign. Next year Scipio Æmilianus was choſen conſul, and ordered to paſs into Africa; and upon his arrival, the face of affairs was greatly changed. At the time of his entering the port of Utica, 3500 Romans were in great danger of being cut in pieces before Carthage. Theſe had ſeized Megalia, one of the ſuburbs of the city; but as they had not furniſhed themſelves with proviſions to ſubſiſt there, and could not retire, being cloſely inveſted on all ſides by the enemy's troops, the prætor Mancinus, who commanded this detachment, ſeeing the danger into which he had brought himſelf, diſpatched a light boat to Utica, to acquaint the Romans there with his ſituation. Æmilianus received this letter a few hours after his landing; and immediately flew to the relief of the beſieged Romans, obliged the Carthaginians to retire within their walls, and ſafely conveyed his countrymen to Utica. Having then drawn together all the troops, Æmilianus applied himſelf wholly to the ſiege of the capital. His firſt attack was upon Megalia; which he carried by aſſault, the Carthaginian garriſon retiring into the citadel of Byrſa. Aſdrubal, who had commanded the Carthaginian forces in the field, and was now governor of the city, was ſo enraged at the loſs of Megalia, that he cauſed all the Roman captives taken in the two years the war laſted, to be brought upon the ramparts, and thrown headlong, in the ſight of the Roman army, from the top of the wall: after having, with an exceſs of cruelty, commanded their hands and feet to be cut off, and their eyes and tongues to be torn out. He was of a temper remarkably inhuman, and it is ſaid that he even took pleaſure in ſeeing ſome of theſe unhappy men flayed alive. Æmilianus, in the mean time, was buſy in drawing lines of circumvallation and contravallation acroſs the neck of land, which joined the iſthmus on which Carthage ſtood to the continent. All the avenues on the land ſide of Carthage were thus ſhut up, ſo that the city could receive no proviſions that way. His next care was to raiſe a mole in the ſea, to block up the old port, the new one being already ſhut up by the Roman fleet; and this great work he effected with immenſe labour. The mole reached from the weſtern neck of land, of which the Romans were maſters to the entrance of the port; being 90 feet broad at the bottom and 80 at the top. The beſieged, when the Romans firſt began this ſurpriſing work, laughed at the attempt; but were no leſs alarmed than aſtoniſhed, when they beheld a vaſt mole appearing above water, and by that means the port rendered inacceſſible to ſhips, and quite uſeleſs. Prompted by deſpair, however, the Carthaginians, with incredible and almoſt miraculous induſtry, dug a new baſon, and cut a paſſage into the ſea, by which they could receive the proviſions that were ſent them by the troops in the field. With equal dilligence and expedition, they fitted out a fleet of 50 triremes: which, to the great ſurpriſe of the Romans, appeared ſuddenly advancing into the ſea through this new canal, and even ventured to give the enemy battle. The action laſted the whole day, with little advantage on either ſide, The day after, the conſul endeavoured to make himſelf maſter of a terrace, which covered the city on the ſide next the ſea; and on this occaſion the beſieged ſignalized themſelves in a moſt remarkable manner. Great numbers of them naked and unarmed, went into the water in the dead of the night, with unlighted torches in their hands; and having, partly by ſwimming, partly by wading, got within reach of the Roman engines, they ſtruck fire, lighted their torches, and threw them with fury againſt the machines. The ſudden appearance of theſe naked men, who looked like ſo many monſters ſtarted up out of the ſea, ſo terrified the Romans who guarded the machines, that they began to retire in the utmoſt confuſion. The conſul, who commanded the detachment in perſon, and had continued all night at the foot of the terrace, endeavoured to ſtop his men, and even ordered thoſe who fled to be killed. But the Carthaginians, perceiving the confuſion the Romans were in, threw themſelves upon them like ſo many wild beaſts; and having put them to flight with their torches, they ſet fire to the machines, and entirely conſumed them. This, however, did not diſcourage the conſul: he renewed the attack a few days after, carried the terrace by aſſault, and lodged 4000 men upon it. As this was an important poſt, becauſe it pent in Carthage on the ſea ſide, Æmilianus took care to fortify it againſt the ſallies of the enemy; and then, winter approaching, he ſuſpended all further attacks on the place. He was, not, however, inactive. The Carthaginians had a very numerous army under the command of one Diogenes, ſtrongly encamped near Nepheris, whence convoys of proviſions were ſent by ſea to the beſieged, and brought into the new baſon. To take Nepheris, therefore, Æmilianus firſt forced the enemy's entrenchments, put 70,000 to the ſword, and made 10,000 priſoners; all the country people, who could not retire to Carthage, having taken refuge in this camp. After this, he laid ſiege to Nepheris, which he reduced in 22 days. Aſdrubal, diſheartened by the defeat of the army, and touched with the miſery of the beſieged, now reduced to the utmoſt extremity for want of proviſions, offered to ſubmit to any conditions the Romans pleaſed, provided the city was ſpared; but this was abſolutely refuſed. Early in the ſpring, Æmilianus renewed the ſiege of Carthage; and to open a way into the city, he ordered Lælius to attempt the reduction of Cotho, a ſmall iſland which divided the two ports. Æmilianus, himſelf made a falſe attack on the citadel, in order to draw the enemy thither. This ſtratagem, had the deſired effect; for the citadel being a place of the greateſt importance, moſt of the Carthaginians haſtened thither and made their utmoſt efforts to repulſe their aggreſſors. But in the mean time Lælius having, with incredible expedition, built a wooden bridge over the channel which divided Cotho from the iſthmus, entered the iſland, ſcaled the walls of the fortreſs which the Carthaginians had built there, and made himſelf maſter of that important poſt. The proconſul, who was engaged before Byrſa, no ſooner underſtood, by the loud ſhouts of the troops of Lælius, that he had made himſelf maſter of Cotho, than he abandoned the falſe attack, and unexpectedly fell on the neighbouring gate of the city, which he broke down, notwithſtanding the ſhowers of darts that were inceſſantly diſcharged upon his men from the ramparts. Night coming on, he made a lodgement within the gate, and at day-break ordered 4000 freſh troops to be ſent from his camp, and, having ſolemnly devoted to the infernal gods the unhappy Carthaginians, he began to advance through the ſtreets of the city, to attack the citadel. Having advanced to the market place, he found that the way to the citadel lay through 3 exceeding ſteep ſtreets. The houſes on both ſides were very high, and filled with Carthaginians, who overwhelmed the Romans as they advanced with darts and ſtones; ſo that they could not proceed till they had cleared them. To this end Æmilianus in perſon, at the head of of a detachment, attacked the firſt houſe, and made himſelf maſter of it ſword in hand. His example was followed by the officers and ſoldiers, who went on from houſe to houſe putting all they met with to the ſword. As faſt as the houſes were cleared on both ſides, the Romans advanced towards the citadel: but met with a vigorous reſiſtance from the Carthaginians. From the market place to the citadel, two bodies of men fought their way every ſtep, one above on the roofs of the houſes, the other below in the ſtreets. The ſlaughter was inexpreſſibly dreadful. The air rung with lamentations. Some were cut in pieces, others threw themſelves down from the tops of the houſes; ſo that the ſtreets were filled with dead and mangled bodies. But the deſtruction was yet greater, when the proconſul commanded fire to be ſet to that quarter of the town which lay next to the citadel. Incredible multitudes, who had eſcaped the ſwords of the enemy, periſhed in the flames, or by the fall of the houſes. After the fire, which laſted ſix days, had demoliſhed a ſufficient number of houſes, Æmilianus ordered the rubbiſh to be removed, and a large ærea to be made, where all his troops might have room to act. Then he appeared with his whole army before Byrſa; which ſo terrified the Carthaginians, who had fled thither for refuge, that 25,000 women, and 30,000 men, came out of the gates in ſuch a condition as moved pity. They threw themſelves proſtrate before the Roman general, aſking no favour but life. This was readily granted, not only to them, but to all that were in Byrſa, except the Roman deſerters, whoſe number amounted to 900. Aſdrubal's wife earneſtly intreated her huſband to ſuffer her to join the ſuppliants, and carry with her to the proconſul her two ſons, who were as yet very young; but the barbarian denied her requeſt, and rejected her remonſtrances with menaces. The Roman deſerters ſeeing themſelves excluded from mercy, reſolved to die ſword in hand. Then Aſdrubal, finding them all reſolved to defend themſelves to the laſt breath, committed to their care his wife and children: after which he, in a moſt cowardly manner, privately threw himſelf at the conqueror's feet. The Carthaginians in the citadel no ſooner underſtood that their commander had abandoned the place, than they threw open the gates, and put the Romans in poſſeſſion of Byrſa. They had now no enemy to contend with but the 900 deſerters; who, being reduced to deſpair, retreated into the temple of Æſculapius, which was a ſecond temple within the firſt. There the proconſul attacked them; and theſe unhappy wretches finding there was no way to eſcape, ſet fire to the temple. As the flames ſpread, they retreated from one part of the building to another, till they got to the roof. There Aſdrubal's wife appeared in her beſt apparel, and uttered the moſt bitter imprecations againſt her huſband, whom ſhe ſaw ſtanding below with Æmilianus. "Baſe coward (ſaid ſhe,) the mean things thou haſt done to ſave thy life ſhall not avail thee; thou ſhalt die this inſtant, at leaſt in thy two children." Having thus ſpoken, ſhe ſtabbed both the infants with a dagger: and while they were yet ſtruggling for life, threw them both from the top of the temple, and then leaped down after them into the flames. The philanthropiſt is ſhocked to read of ſuch accumulated diſtreſs, and the philoſopher is mortified by the reflection, that the ſage *Cato* was the prime mover of all this complicated miſery. Æmilianus delivered up the city to be plundered, in the manner preſcribed by the Roman military law. The ſoldiers were allowed to appropriate to themſelves all the furniture, utenſils, and braſs money, they ſhould find in private houſes: but all the gold and ſilver, the ſtatues, pictures, &c. were reſerved to be put into the hands of the quæſtors. On this occaſion the cities of Sicily, which had been often plundered by the Carthaginian armies, recovered a number of ſtatues, pictures, and other valuable monuments: amongſt the reſt, the famous braſen bull, which Phalaris had ordered to be caſt, and uſed as the chief inſtrument of his cruelty, was reſtored to the inhabitants of Agrigentum. As Æmilianus wiſhed to ſpare what remained of this ſtately metropolis, he wrote to the ſenate on the ſubject, from whom he received the following orders: 1. To deſtroy entirely the city of Carthage, with Byrſa, and Megalia, and to leave no traces of them. 2. To diſmantle all the cities that had lent Carthage any aſſiſtance. 3. To enlarge the territories of thoſe cities, which had declared for the Romans, with lands taken from the enemy. 4. To divide all the lands between Hippo and Carthage among the inhabitants of Utica. 5. To ſubject all the Africans of the Carthaginian ſtate, both men and women, to pay an annual tribute at ſo much per head. 6. To turn the whole country, formerly ſubject to the Carthaginian ſtate, into a Roman province, to be governed by a prætor, like Sicily. Commiſſioners were alſo ſent into Africa, to ſettle jointly with the proconſul the ſtate of the new province. Before Æmilianus deſtroyed the city, he performed the uſual ſuperſtitious ceremonies, erroneouſly ſtiled *religious*; after which, the towers, ramparts, walls, and other works, which the Carthaginians had raiſed in the courſe of many ages, were levelled with the ground; and laſtly, fire was ſet to the edifices of the metropolis. Though the fire began in all quarters at the ſame time, and burnt with incredible fury, it continued for 17 days before all the buildings were conſumed. Thus fell Carthage, about A. A. C. 146; a city whoſe deſtruction may be attributed more to the intrigues of an abandoned faction, than to the power of its rival. The treaſure Æmilianus carried off was immenſe; Pliny making it amount to 4,470,000 pounds weight of ſilver.

(7.) CARTHAGE, MODERN HISTORY OF. The Romans ordered Carthage never to be inhabited again, denouncing dreadful imprecations againſt thoſe who ſhould attempt to rebuild any part of it, eſpecially Byrſa and Megalia. About 24 years after, however, C. Gracchus, tribune of the people, undertook to rebuild it; and, to that end, conducted thither a colony of 6000 Roman citizens. The workmen, according to Plutarch, were terrified by many unlucky omens, while they were laying the foundations of the new city; which the ſenate being informed of, they would have ſuſpended the attempt. But the tribune, little affected with ſuch preſages, continued to carry on the work, and finiſhed it in a few days. From hence it is probable that only a ſlight kind of huts were erected; but, whether Gracchus executed his deſign, or the work was entirely diſcontinued, it is certain, that Carthage was the firſt Roman colony ever ſent out of Italy. According to ſome, it was rebuilt by Julius Cæſar; and Strabo, who flouriſhed in the reign of Tiberius, affirms it to have been equal, in his time, if not ſuperior, to any other city in Africa. It was reckoned the capital of Africa for near 700 years after the Chriſtian æra. Maxentius laid it in aſhes about the 6th or 7th year of Conſtantine's reign. Genſeric, king of the Vandals, took it A. D. 439; (See BARBARY, N° I. § 3.) but about a century afterwards it was re-annexed to the Roman empire by the renowned Beliſarius. At laſt the Saracens, under Mohammed's ſucceſſors, towards the cloſe of the 7th century, ſo completely deſtroyed it, that there are now ſcarce any traces remaining. See § 8.

(8.) CARTHAGE, PRESENT STATE OF. On the ruins of Carthage there now ſtands a ſmall village, called MELCHA. The few remains of Carthage conſiſt only of ſome fragments of walls and 18 ciſterns for the reception of rain water. There are three eminences, which are ſo many maſſes of fine marbles pounded together, and were in all probability the ſites of temples and other diſtinguiſhed buildings. The preſent ruins are not the remains of the ancient city deſtroyed by the Romans; who after taking it entirely eraſed it, and ploughed up the very foundations: ſo ſtrictly they adhered to the inhuman advice perpetually inculcated by Cato the Elder, *Delenda eſt Carthago.* They are the ruins of the 2d city, which was deſtroyed by the Saracens. See § 7.

(II.) CARTHAGE, CAPE, a promontory of Africa, 10 m. E. of Tunis, near the ſite of old Carthage.

(III.) CARTHAGE, NEW, a rich trading town of Mexico, and the capital of Coſta-Rica, 368 miles W. of Panama. Lon. 85. 10. W. Lat. 9. 55. N.

(1.) CARTHAGENA, a province of Terra Firma, South America, bounded on the W. by the Iſthmus of Darien; on the N. by the Caribbean ſea; on the E. by St Martha, and on the S. by Popayan. It is mountainous, but there are many well watered and fertile vallies. It is one of the moſt conſiderable provinces in New Caſtile, but receives its principal ſupport from the trade carried on with its capital, N° 2. Although the vallies are fertile, the other parts are barren and little cultivated. Theſe, however, produce a variety of valuable drugs; and ſome precious ſtones, particularly emeralds.

(2.) CARTHAGENA, the capital of the province, (N° 1.) ſituated on a ſandy iſland, by moſt writers called a peninſula; which, forming a narrow paſſage on the SW. opens a communication with Tierra Bomba, as far as Bocca-Chica. The little iſland which now joins them was formerly the entrance of the bay; but it having been filled up by order of the court, Bocca-Chica became the only entrance. This, however, has been filled up ſince the attempt of Vernon and Wentworth, and the old paſſage again opened. On the N. ſide the land is ſo narrow, that, before the wall was begun, the diſtance from ſea to ſea was only 35 toiſes; but afterwards enlarging, it forms another iſland on this ſide; ſo that, excepting theſe two places, the whole city is entirely ſurrounded by water. On the E. it has a communication, by a wooden bridge, with a large ſuburb called XEMANI, built on another iſland, which is alſo joined to the continent by a bridge of the ſame materials. The fortifications both of the city and ſuburbs are built after the modern manner, and lined with free-ſtone; and, in time of peace, the garriſon conſiſts of ten companies of 77 men each, beſides militia. The city and ſuburbs are well laid out, the ſtreets ſtraight, broad, uniform, and well paved. All the houſes are built of ſtone or brick, only one ſtory high, well contrived, neat, and furniſhed with balconies and lattices of wood; which is more durable in that climate than iron, the latter being ſoon corroded by the acrimonious quality of the atmoſphere. The climate is exceedingly unhealthy. The Europeans are particularly ſubject to a diſeaſe called the BLACK VOMIT, which ſweeps off multitudes annually on the arrival of the galleons. It ſeldom continues above 3 or 4 days; in which time the patient is either dead or out of danger, and if he recovers, is never ſubject to a return of the diſtemper. This diſeaſe has hitherto foiled all the art of the Spaniſh phyſicians; as has alſo the leproſy, which is very common here. A painful tumour in the legs, occaſioned by the entrance of the Guinea worm, is alſo very common and troubleſome. See DRACUNCULI. Another diſorder peculiar to this country, and Peru, is occaſioned by a little inſect called *Nigua*, ſo extremely minute, as ſcarce to be viſible to the naked eye. See NIGUA. The harbour of Carthagena is the ſafeſt and beſt fortified in the Spaniſh American dominions. It was choſen as the port in which the galleons ſhould firſt begin to trade on their arrival from Europe; and to which they were directed to return, in order to prepare for their voyage homeward. This circumſtance raiſed its ſplendour and importance, which now muſt be affected in a great degree, by the change in the Spaniſh ſyſtem of trade with America, which has withdrawn from it the viſits of the galleons. It was taken by the Engliſh in 1585, and by the French in 1697, who found immenſe booty; but Admiral Vernon, though he had taken the forts, in 1741, was obliged to abandon the ſiege. Lon. 75. 22. W. Lat. 10. 27. N.

(3.) **CARTHAGENA**, a territory of Spain, in the kingdom of Murcia.

(4.) **CARTHAGENA**, the capital of the above territory, (N° 3.) built by Aſdrubal. (See CARTHAGE, N° I. § 6.) It has the beſt harbour as well as the moſt conſiderable docks and magazines, in all Spain. The principal crops of barilla are produced in its vicinity; and a fine red earth, called *almaga*, uſed in poliſhing mirrors, and preparing tobacco for ſnuff. In 1706 it was taken by Sir John Leak; but the D. of Berwick retook it. It is 27 miles S. of Murcia. Lon. 0. 36. W. Lat. 37. 38. N.

(5.) **CARTHAGENA BAY**, in South America, is one of the beſt in that country. It extends two leagues and an half from N. to S. has good anchorage, ſufficient depth of water, and is ſo ſmooth, that ſhips ride with as much eaſe and ſafety as in a river. The entrance is ſo narrow, that a ſingle ſhip can only paſs, and that cloſe by the ſhore; but a pilot is provided at the expence of government, to conduct ſtrangers, and to fix marks on dangerous places. The tides in this bay and on the whole coaſt, are irregular. Sometimes they flow a whole day, then ebb 4 or 5 hours, yet the greateſt change of the depth is only 2 feet or 2½; and they are ſometimes only perceived by the current or flow of the water. The bay abounds with a great variety of fiſh, the moſt common of which are the ſhad. The turtles are large and excellent; there are alſo ſharks, which are extremely dangerous. The natives affirm they have ſeen alligators; but theſe being freſh water animals, the fact is very doubtful. Here the Spaniſh galleons wait the arrival of the Peru fleet at Panama, then ſail for Porto Bello; and at the termination of the market held there, return to the bay, and having provided themſelves with every neceſſary, put to ſea again. In their abſence the bay is little frequented.

CARTHAGINIAN MOLES, a ſpecies of moles, mentioned in *Condamine's Italy. Eng. Tranſ.* p. 28. He ſays they are deſcribed by Theophraſtus and Ariſtotle, but gives no ſynonyme, by which they may be found in *Linnæi Syſtema Naturæ*. Neither Linnæus, Gmelin, nor Pennant mention them under this title: and we have examined Mr Kerr's Animal Kingdom, under the different genera, TALPA, SOREX, and MYOTALPA, in vain for them.

CARTHAGINIANS, the ancient inhabitants of Carthage. See CARTHAGE, N° I. § 3—6. The character tranſmitted to us, of this people, is extremely bad; but we have it only on the authority of the Romans, who, being their implacable enemies, cannot be relied upon. Their religion, manners, &c. being much the ſame with thoſe of the PHOENICIANS, the reader is referred for an account of theſe matters to that article.

CARTHAMUS, in botany: A genus of the order of polygamia æqualis, belonging to the ſyngeneſia claſs of plants, and in the natural method ranking under the 49th order, Compoſitæ. The calyx is ovate, imbricated with ſcales, cloſe below, and augmented with ſubovate foliaceous appendices at top.—Of this genus there are 9 ſpecies; but the only remarkable one is

CARTHAMUS TINCTORIUS, with a ſaffron coloured flower, a native of Egypt and ſome of the warm parts of Aſia. It is cultivated in many parts of Europe, and in the Levant, from whence great quantities of it are annually imported into Britain for dyeing and painting. It is an annual plant, and riſes with a ſtiff ligneous ſtalk, about 2½ or 3 feet in height, dividing upwards into many branches, garniſhed with oval pointed leaves ſitting cloſe to the branches. The flowers grow ſingle at the extremity of each branch; the heads of the flowers are large, incloſed in a ſcaly empalement; each ſcale is broad at the baſe, flat, and formed like a leaf of the plant, terminating in a ſharp ſpine. The lower part of the empalement ſpreads open; but the ſcales above cloſely embrace the florets, which are of a fine ſaffron colour, and are the part uſed for the purpoſes abovementioned. The good quality of this commodity is in the colour, which is of a bright ſaffron hue: and in this the Britiſh carthamus very often fails; for if there happens much rain during the time the plants are in flower, the flowers change to a dark or dirty yellow, as they likewiſe do if the flowers are gathered with any moiſture remaining upon them. The plants are propagated by ſeeds, which ſhould be ſown in drills, ſingly, 2½ feet diſtant. The plants will appear in leſs than a month; and in 3 weeks or a month after, it will be proper to hoe the ground; when the plants ſhould be left 6 inches diſtant: after this they will require a 2d hoeing; when they muſt be thinned to the diſtance at which they are to remain. If after this they are hoed a 3d time, they will require no farther care till they flower; when, if the ſafflow is intended for uſe, the florets ſhould be cut off from the flowers as they come to perfection: but this muſt be performed when they are perfectly dry; and then they ſhould be dried in a kiln with a moderate fire, in the ſame manner as the true ſaffron. But in thoſe flowers which are propagated for ſeeds, the florets muſt be cut off, or the ſeeds will prove abortive. The ſeeds have been celebrated as a cathartic; but they operate very ſlowly, and for the moſt part diſorder the ſtomach and bowels, eſpecially when given in ſubſtance: triturated with diſtilled aromatic waters, they prove leſs offenſive, yet inferior in efficacy to the common purgatives. A ſpecies of Egyptian parrot is very fond of them; to other birds or beaſts they would prove a mortal poiſon.

CARTHENA, a river of Algiers. See CELEF.

CARTHKENNY, a river in Caermarthenſhire.

* CART-HORSE. *n. ſ.* [from *cart* and *horſe.*] A coarſe unweildy horſe, fit only for the cart.—It was determined, that theſe ſick and wounded ſoldiers ſhould be carried upon the *cart-horſes. Knolles.*

CARTHUSIAN POWDER. See KERMES.

CARTHUSIANS, a religious order founded A. D. 1080, by one Brudo; ſo called from the deſert of CHARTREUSE, the place of their inſtitution. Their rule is extremely ſevere. They muſt not go out of their cells, except to church, without leave of their ſuperior; nor ſpeak to any perſon without leave. They muſt not keep any meat or drink till next day; their beds are of ſtraw, covered with a felt; their clothing 2 hair-cloths, 2 cowls, 2 pair of hoſe, and a cloke, all coarſe. In the refectory, they muſt keep their eyes on the diſh, their hands on the table, their attention on the reader, and their hearts fixed on God. Women muſt not come into their churches. It is computed that there are 172 houſes of Carthuſians; whereof 5 are of nuns, who practiſe the ſame auſterities as the monks. They are divided into 16 provinces, each of which has two viſitors. There have been ſeveral canonized ſaints of this order, 4 cardinals, 70 archbiſhops and biſhops, and many learned authors.

* CART-JADE. *n. ſ.* [from *cart* and *jade.*] A vile horſe, fit only for the cart.—He came out with all his clowns, horſed upon ſuch *cart-jades*, ſo furniſhed, I thought if that were thrift, I wiſhed none of my friends or ſubjects ever to thrive. *Sidney.*

(1.) * CARTILAGE. *n. ſ.* [*cartilago*, Lat.] A ſmooth and ſolid body, ſofter than a bone, but harder than a ligament. In it are no cavities or cells for containing of marrow; nor is it covered over with any membrane to make it ſenſible, as the bones are.—The *cartilages* have a natural elaſticity, by which, if they are forced from their natural figure or ſituation, they return to it of themſelves, as ſoon as that force is taken away. *Quincy.*—Canals, by degrees, are aboliſhed, and grow ſolid; ſeveral of them united, grow a membrane; theſe membranes farther conſolidated become *cartilages*, and *cartilages* bones. *Arbuthnot.*

(2.) CARTILAGE. See ANATOMY, *Index.*

* CARTILAGINEOUS. }
(1.) * CARTILAGINOUS. } *n. ſ.* [from *cartilage.*] Conſiſting of cartilages.—By what artifice the *cartilagineous* kind of fiſhes poiſe themſelves, aſcend and deſcend at pleaſure, and continue in what depth of water they liſt, is as yet unknown. *Ray.*—The larynx gives paſſage to the breath, and, as the breath paſſeth through the rimula, makes a vibration of thoſe *cartilaginous* bodies, which forms that breath into a vocal ſound or voice. *Holder's Elements of Speech.*

(2.) CARTILAGINOUS, in ichthyology, a title given to all fiſh whoſe muſcles are ſupported by cartilages inſtead of bones. It comprehends the ſame genera to which Linnæus has given the name of *amphibia nantes:* but the word AMPHIBIA ought properly to be confined to ſuch animals as inhabit both elements; and can live, without any inconvenience, for a conſiderable time, either on land or in water; ſuch as tortoiſes, frogs, and ſeveral ſpecies of lizards; and among the quadrupeds, hippopotami, phocæ, &c. &c. Many of the cartilaginous fiſh are viviparous, being excluded from an egg, which is hatched within them. The egg conſiſts of a white and a yoke; and is lodged in a caſe formed of a thick tough ſubſtance, not unlike ſoftened horn: ſuch are the eggs of the ray and ſhark kinds. Some are oviparous; ſuch as the ſturgeon, &c. They breathe either through certain apertures beneath, as in the ray; on their ſides, as in the ſhark, &c.; or on the top of the head, as in the pipe-fiſh: for they have not covers to their gills, like the bony fiſh.

CARTINGTON, a town in Northumberland, near N. and S. Carlton.

CARTISMANDUA, queen of the Brigantes, the infamous betrayer of the brave Caractacus. See CARACTACUS. She was alſo falſe to her huſband, Venutius; but at laſt met with the reward of her perfidies; being taken priſoner by Corbred I. king of Scots, and buried alive about A. D. 57.

CARTLIDGE, a town near Cheſham, Bucks.

* CART-LOAD. *n. ſ.* [from *cart* and *load.*] 1. A quantity of any thing piled on a cart.—A *cart load* of carrots appeared of darker colour, when looked upon where the points were obverted to the eye, than where the ſides were ſo. *Boyle.* 2. A quantity ſufficient to load a cart.

CARTLONE PASSAGE is ſituated on the Kent Sands, near Cartmel, Lancaſhire.

(1.) CARTMEL, a town of Lancaſhire, ſeated among the Fells (N° 2.) near the river Kent. It has a handſome church, built in the form of a croſs; and a market on Mond. well ſupplied with corn, ſheep, and fiſh. It is 12 miles N. by W. of Lancaſter, and 260 NNW. of London. Lon. 3. 6. W. Lat. 54. 12. N.

(2.) CARTMEL FELLS, hills of Lancaſhire, near the ſea coſt.

CARTON, a town of Ireland, in Kildare.

(1.) * CARTOON. *n. ſ.* [*cartoni*, Ital.] A painting or drawing upon large paper.—It is with a vulgar idea that the world beholds the *cartoons* of Raphael, and every one feels his ſhare of pleaſure and entertainment. *Watt's Logic.*

(2.) CARTOON, or CARTON, is a deſign drawn on ſtrong paper, to be afterwards calked through and transferred on the freſh plaſter of a wall, to be painted in Freſco. It is alſo uſed for a deſign coloured, for working in moſaic, tapeſtry, &c. The word is from the Italian *cartoni*, (*carta* paper, and *oni* large,) denoting many ſheets of paper paſted on canvas, on which large deſigns are made, whether coloured or with chalks only. Of theſe many are to be ſeen at Rome, particularly by Domenichino. Thoſe by Andrea Mantegna, which are at Hampton Court, were made for paintings in the old ducal palace at Mantua. But the moſt famous performances of this ſort are the

(3.) Cartoons of Raphael, ſo deſervedly applauded throughout Europe by all true admirers of the art of deſign, for their matchleſs merit, particularly with regard to the invention, and to the noble expreſſion of ſuch a variety of characters, countenances, and moſt expreſſive attitudes, as they are differently affected and properly engaged, in every compoſition. Theſe cartoons are 7 in number, and form only a ſmall part of the ſacred hiſtorical deſigns executed by this great artiſt, while engaged in the chambers of the Vatican, under Popes Julius II. and Leo X. When finiſhed, they were ſent to Flanders, to be copied in tapeſtry, for adorning the pontifical apartments: which tapeſtries were not ſent to Rome till ſeveral years after the death of Raphael, and even in all probability were not finiſhed and ſent there before the terrible ſack of that city in the time of Clement VII. when Raphael's ſcholars fled, and none were left to enquire after the original cartoons, which lay neglected in the ſtore-rooms of the manufactory. The important revolution alſo which followed in the Low Countries prevented their being noticed. It was therefore a fortunate circumſtance that theſe 7 eſcaped the wreck of the others, which were torn in pieces, and of which fragments are diſperſed in different collections. These 7 were purchaſed by Rubens for Charles I. and they have been ſo roughly handled from the firſt, that holes were pricked for the weavers to pounce the outlines, and other parts almoſt cut through in tracing. In this ſtate they alſo fortunately eſcaped the ſale amongſt the royal collection, from the diſproportioned appraiſement of theſe 7 at 300l. and the 9 pieces, being the Triumph of Julius Cæſar, by Andrea Mantegna, appraiſed at 1000l. They ſeem to have been little taken notice of, till king William built a gallery, purpoſely to receive them, at Hampton Court; whence they were moved, on their ſuffering from damps, to the Queen's Palace. They are now at Windſor Caſtle, open to public inſpection.

(1.) * CARTOUCH. *n. ſ.* [*cartouche*, Fr.] 1. A caſe of wood 3 inches thick at the bottom, girt round with marlin, and holding 48 muſket balls, and 6 or 8 iron balls of a pound weight. It is fired out of a hobit or ſmall mortar, and is proper for defending a paſs. *Harris.* 2. A portable box for charges.

(2.) Cartouch, in architecture and ſculpture, an ornament repreſenting a ſcroll of paper. It is uſually a flat member, with wavings, to repreſent ſome inſcription, device, cipher, or ornament of armoury. They are, in architecture, much the ſame as modillions; (See *Plate* XX.) only theſe are ſet under the cornice in wainſcotting, and thoſe under the cornice at the eaves of a houſe.

(3.) *A* Cartouch (§ 1. *def.* 1.) holds about 400 muſket balls. It is ſometimes made of a globular form, and filled with a ball of a pound weight; and ſometimes for the guns, being of a ball of half or quarter a pound weight, according to the nature of the gun, tied in form of a bunch of grapes, on a tompion of wood, and coated over. Theſe were made in the room of partridge ſhot.

* CARTRAGE. } *n. ſ.* [*cartouche*, Fr.] A
(1.) * CARTRIDGE. } caſe of paper or parchment filled with gun powder, uſed for the greater expedition in charging guns.—

> Our monarch ſtands in perſon by,
> His new-caſt cannons firmneſs to explore;
> The ſtrength of big-corn'd powder loves to try,
> And ball and *cartrage* ſorts for every bore.
>
> *Dryden.*

(2.) *A* Cartridge holds the exact charge of a fire arm. Thoſe for muſkets, carabines, and piſtols, hold both the powder and ball for the charge; and thoſe for cannon and mortars are uſually in caſes of paſteboard or tin, ſometimes of wood, half a foot long, adapted to the caliber of the piece.

(3.) Cartridge box, a caſe of wood or turned iron, covered with leather, holding a dozen muſket cartridges. It is worn upon a belt, and hangs a little lower than the right pocket hole.

* CART-ROPE. *n. ſ.* [*cart* and *rope.*] A ſtrong cord uſed to faſten the load on the carriage: proverbially any thick cord.

* CARTRUT. *n. ſ.* [from *cart* and *rut*; *route*, a way.] The track made by a cart wheel.

* CARTULARY. *n. ſ.* [from *charta*, paper, Lat.] A place where papers or records are kept.

CART-VONAN, a town in Northumberland, near Great Cheſter, S. of the Picts Wall.

* CART-WAY. *n. ſ.* [from *cart* and *way.*] A way through which a carriage may conveniently travel.—Where your woods are large, it is beſt to have a *cart-way* along the middle of them. *Mortimer's Huſbandry.*

(1.) * CARTWRIGHT. *n. ſ.* [from *cart* and *wright.*] A maker of carts.—After local names, the moſt names have been derived from occupations or profeſſions; as Taylor, Potter, Smith, *Cartwright. Cambden's Remains.*

(2.) Cartwright, Chriſtopher, an Engliſh divine, born at York, in 1602. He was very eminent for his knowledge in the Hebrew language; and wrote *Electa Targumico-Rabbinica in Geneſin, et in Exodum*, publiſhed in 1643 and 1653, 8vo. He died in 1652.

(3.) Cartwright, Thomas, a celebrated divine of the puritan party, born in Hertfordſhire, in 1555. He received his education at St John's college, Cambridge, of which he became a fellow, but afterwards exchanged for a fellowſhip in Trinity. Having taken his degree of B. D. in 1567, he commenced preacher, and became very popular; but his opinions being adverſe to the hierarchy, he was complained off by archbiſhop Grindal, and was ſtopt of his doctor's degree, and obliged to give up his fellowſhip. He now went over to the continent, and was choſen miniſter to the Engliſh merchants at Antwerp, and afterwards at Middleburg; but returning to England, he uſed his utmoſt endeavour to overturn the eccleſiaſtical order, and eſtabliſh the diſcipline of the Genevan church. Having written ſeveral pieces with that view, to which Dr Whitgift replied, Cartwright was at length thrown into priſon. By the favour of lord Burleigh and the earl of Leiceſter, however, he was releaſed from his confinement, and the latter appointed him maſter of his hoſpital at Warwick, where he died in 1603. He wrote a Harmony of the Goſpels in Latin, which was publiſhed at Amſterdam in 1647; alſo a Commentary on the Proverbs, and various other works.

(4.) **Cartwright**, Thomas, biſhop of Cheſter, was born at Northampton, in 1634. He was educated among the puritans, and became a fellow of Queen's college, Oxford, but received an epiſcopal ordination; and at the reſtoration obtained the degree of D. D. was appointed prebendary of St Paul's, and chaplain to the king. He was nominated to the ſee of Cheſter, on the death of biſhop Pearſon; but became unpopular by too much countenancing the arbitrary proceedings of king James, whom he followed both to France and Ireland. He died in the latter country, in 1689, and was buried with great ſolemnity in Chriſt-church, Dublin. Several of his ſermons have been printed.

(5.) **Cartwright**, William, an eminent divine and poet, born at Northway, near Tewkſbury, in Glouceſterſhire, in 1611. He finiſhed his education at Oxford; afterwards went into orders, and became a moſt florid preacher in the univerſity. In 1642, he was ſucceſſor in the church of Saliſbury; and, in 1643, junior proctor and metaphyſical reader in the univerſity.—Wit, judgment, elocution, a graceful perſon and behaviour, occaſioned that encomium from dean Fell, "That he was the utmoſt that man could come to." He was an expert linguiſt, an excellent orator, and eſteemed an admirable poet. There are extant 4 of his plays, and ſome poems. He died in 1644, aged 33.

CARVA, in old records, a plough land.

(1.) **CARVAGE**, [*carvagium*,] the ſame with **Carrucage**. Henry III. is ſaid to have taken carvage, that is 2 marks of ſilver off every knight's fee, towards the marriage of his ſiſter Iſabella to the emperor. Carvage could only be impoſed on the tenants *in capite*.

(2.) **Carvage** denotes alſo a privilege whereby a man is exempted from the ſervice of carrucage.

CARUCATARIUS, in ancient law books, one who held land in ſoccage, or in plough tenure.

CARUCATE. See **Carrucate.**

(1.) * *To* **CARVE.** *v. a.* [*ceorfan*, Sax. *kerven*, Dutch.] 1. To cut wood, or ſtone, or other matter, into elegant forms.—Taking the very refuſe, he hath *carved* it diligently when he had nothing elſe to do. *Wiſdom*, xiii. 13. 2. To cut meat at the table. 3. To make any thing by carving or cutting.—

> Yet fearing idleneſs, the nurſe of ill,
> In ſculpture exercis'd his happy ſkill;
> And *carv'd* in iv'ry ſuch a maid, ſo fair,
> As nature could not with his art compare,
> Were ſhe to work. *Dryden.*

4. To engrave.—

> Run, run, Orlando, *carve* on ev'ry tree,
> The fair, the chaſte, the unexpreſſive ſhe.
> *Shakeſpeare.*

5. To diſtribute; to aportion; to provide at will.—How dares ſinful duſt and aſhes invade the prerogative of Providence, and *carve* out to himſelf the ſeaſons and iſſues of life and death? *South.* 6. To cut; to hew.—

> Brave Macbeth with his brandiſh'd ſteel,
> Like valour's minion, *carved* out his paſſage.
> *Shakeſpeare.*

(2.) * *To* **Carve.** *v. n.* 1. To exerciſe the trade of a ſculptor. 2. To perform at table the office of ſupplying the company from the diſhes.—I do mean to make love to Ford's wife; a ſpy entertainment in her; ſhe diſcourſes, ſhe *carves*, ſhe gives the leer of invitation. *Shakeſpeare.*—

> Well then, things handſomely were ſerv'd;
> My miſtreſs for the ſtrangers *carv'd*. *Prior.*

* **CARVEL.** *n. ſ.* A ſmall ſhip.—I gave them order, if they found any Indians there, to ſend in the little fly-boat, or the *carvel*, into the river: for, with our great ſhips, we durſt not approach the coaſt. *Raleigh.*

(1.) * **CARVER.** *n. ſ.* [from *carve*.] 1. A ſculptor.—

> All arts and artiſts Theſeus could command,
> Who ſold for hire, or wrought for better fame;
> The maſter painters, and the *carvers* came.
> *Dryden.*

2. He that cuts up the meat at the table.—

> Meanwhile thy indignation yet to raiſe,
> The *carver*, dancing round each diſh, ſurveys
> With flying knife, and, as his art directs,
> With proper geſtures ev'ry fowl diſſects. *Dryd.*

3. He that apportions, or diſtributes at will.—We are not the *carvers* of our own fortunes. *L'Eſtr.*

(2.) **Carver.** See § 1. *def.* 1. and **Carving**, § 2. Carvers anſwer to what the Romans called *ſculptores*, who were different from *cælatores*, or engravers, as theſe laſt wrought in metal. See **Cælatura.**

(3.) *A* **Carver** (§ 1. *def.* 2.) was ſtiled by the Romans, *carptor* and *carpus*; ſometimes **scissor**, *ſcindendi magiſter*, and *ſtructor*. In the great families at Rome, the carver was an officer of ſome figure. There were maſters to teach the art regularly, by figures of animals cut in wood. The Greeks alſo had their carvers, called δαιτροι, q. d. *deribitares*, or *diſtributors*. In the primitive times, the maſter of the feaſt carved for all his gueſts. Thus in Homer, when Agamemnon's ambaſſadors were entertained at Achiles's table, the hero himſelf carved the meat. In Sparta, the office on ſolemn occaſions was expected by ſome of the chief men. In Scotland, the king has a hereditary carver in the family of Anſtruther.

(4.) **Carver**, a townſhip of Maſſachuſetts, in Plymouth county, abounding with excellent iron ore.

(5.) **Carver**, Jonathan, was born at Connecticut, North America, in 1732. His father, who was a juſtice of peace, died when he was only 5 years of age; and his friends educated him for the medical line; but he preferred a military life, and, joining the army, ſerved with conſiderable reputation till the peace of 1763. He afterwards reſolved on travelling, and the route he projected was that of a man of courage and fortitude: it was to explore the interior of America, and to penetrate as far as the Pacific Ocean; which he accompliſhed, amidſt innumerable difficulties, and publiſhed an Account of his Travels, in 1776.

After returning from his arduous journey, he came over to England, in hopes of ſome preferment, but was diſappointed, and, to ſupport himſelf and his family, was under the neceſſity of accepting the office of clerk of the lottery. He died in very poor circumſtances, in 1780. Beſides the Account of his Travels, he wrote an Eſſay on the *Culture of Tobacco.*

CARUI, or Carvi, in botany. See Carum.

(1.) * CARVING. *n.ſ.* [from *carve.*] Sculpture; figures carved.—They can no more laſt like the ancients, than excellent *carvings* in wood, like thoſe in marble and braſs. *Temple.*

(2.) Carving, in a general ſenſe, the art or act of cutting or faſhioning a hard body, by means of ſome ſharp inſtrument, eſpecially a chiſſel. In this ſenſe carving includes ſtatuary and engraving, as well as cutting in wood.

(3.) Carving, in a limited ſenſe, is the art of cutting figures in wood. In this ſenſe, according to Pliny, it is prior both to ſtatuary and painting. To carve a figure, it muſt be firſt drawn or paſted on the wood. The reſt of the block, not covered by the lines of the deſign, are then to be cut away with little narrow pointed knives. The wood fitteſt for the uſe is that which is hard, tough, and cloſe, as beech, but eſpecially box: to prepare it for drawing the deſign on, it is waſhed over with white lead tempered in water; which enables it either to bear ink or the crayon, or even to take the impreſſion by chalking. When the deſign is to be paſted on the wood, this whitening is omitted. The printed ſide of the figure being wiped over with gum tragacanth diſſolved in water, it is clapped ſmooth on the wood, and let dry; then wet ſlightly over, and the ſurface of the paper gently fretted off, till all the ſtrokes of the figure appear diſtinctly; after which the carver begins to cut out the figure.

CARUM, in botany: A genus of the digynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 45th order, *Umbellatæ.* The fruit is ovate, oblong, and ſtriated; the involucrum monophyllous: the petals are carinated or keel-ſhaped below, and marginated by their inflection.

1. Carum carui, the caraway of the ſhops, grows naturally in many places of Britain. It is a biennial plant, which riſes from ſeeds one year, flowers the next, and periſhes ſoon after the ſeeds are ripe. It has a ſtrong aromatic taſte, and a taper root like a parſnip, but much ſmaller, which runs deep into the ground, ſending out many ſmall fibres. From the root ariſes one or two ſmooth, ſolid, channelled ſtalks, about two feet high, garniſhed with winged leaves, having long naked foot ſtalks.

2. Carum hispanicum is alſo a biennial, and is a native of Spain. It riſes with a ſtronger ſtalk than the former, which ſeldom grows more than a foot and a half high; but is cloſely garniſhed with fine narrow leaves like thoſe of dill. Both theſe plants are propagated by ſeeds which ought to be ſown in autumn. Sheep, goats, and ſwine, eat this plant; cows and horſes are not fond of it. Parkinſon ſays, the young roots of caraway are better eating than parſnips. The tender leaves may be boiled with pot herbs. The ſeeds have an aromatic ſmell, and a warm pungent taſte They are uſed in cakes, incruſted with ſugar, as ſweet meats, and diſtilled with ſpirituous liquors for the ſake of the flavour they afford. They are in the number of the four greater hot ſeeds; and frequently employed, as a ſtomachic and carminative, in flatulent colics and the like.

(1.) * CARUNCLE. *n.ſ.* [*caruncula,* Lat.] A ſmall protuberance of fleſh, either natural or morbid.—*Caruncles* are a ſort of looſe fleſh, ariſing in the urethra by the eroſion made by virulent acid matter. *Wiſeman.*

(2.) Caruncles in the urethra, proceeding from a gonorrhœa, or an ulceration of the urethra, may be reduced by introducing the bougie.

CARUNCULA, or Caruncle, in anatomy is a term applied to ſeveral parts of the human body, Thus,

1. Carunculæ cuticulares alæ, a name which ſome botaniſts give the nymphæ.

2. Carunculæ lachrymales. } See Anatomy, § 568,
3. Carunculæ myrtiformes. } and 320.

4. Carunculæ papillares, or mamillares, little protuberances in the inſide of the pelvis of the kidneys, made by the extremities of the tubes, which bring the ſerum from the glands in the exterior parts, to the pelvis. They are about the ſize of a pea, and were firſt obſerved by Carpus.

(1.) CARUS, a ſudden deprivation of ſenſe and motion, affecting the whole body. See Medicine. *Index.*

(2.) Carus, Marcus Aurelius, was raiſed from a low ſtation, by his great merit, to be emperor of Rome, A. D. 282; and ſoon after aſſociated his ſons Carinus and Numerian in the empire, along with him. He ſhowed himſelf worthy of the empire; ſubdued its enemies; and gave the Romans a proſpect of happy days, when he was unfortunately killed by lightning in 284. Numerian was murdered ſoon after, and Carinus did not long ſurvive his father and brother. See Rome.

CARWAR, a town of Aſia, on the coaſt of Malabar in the Eaſt Indies, where the Eaſt India company have a factory, fortified with two baſtions. It is ſubject to the regent of Myſore. The valleys around it abound in corn, and produce the beſt pepper in the Eaſt Indies. The woods on the mountains abound with quadrupeds, ſuch as tygers, wolves, monkeys, wild hogs, deer, elks, and beeves of a prodigious ſize. The religion of the natives is Paganiſm; and they have many ſuperſtitious cuſtoms. It is 68 miles S. of Goa. Lon. 73. 7. E. Lat. 15. 6. N.

(1.) CARY, Lucius, lord viſcount Falkland, was born in Oxfordſhire, about A. D. 1610; a young nobleman of great abilities. About the time of his father's death in 1633, he was made gentleman of the privy chamber to king Charles I. and afterwards ſecretary of ſtate. Before the aſſembling of the long parliament, he had devoted himſelf to literature, and every pleaſure which a fine genius, a generous diſpoſition, and an opulent fortune, could afford: when called into public life, he ſtood foremoſt in all attacks on the high prerogative of the crown; but when civil convulſions came to an extremity, and it was neceſſary to chooſe a ſide, he tempered his zeal, and defended the limited powers that remained to monarchy. Anxious however for his country, he ſeems to have dreaded equally the proſperity of the royal party, and that of the parliament; and among his intimate friends, often ſadly reiterated the word *peace*. Yet he freely expoſed his perſon for the king in all hazardous enterprizes, and was killed in the 34th year of his age at the battle of Newberry. In Welwood's memoirs we are told, that whilſt he was with the king at Oxford, they went one day to ſee the public library, where they were ſhown among other books a Virgil, finely printed and exquiſitely bound. Lord Falkland, to divert the king, propoſed that he ſhould make a trial of his fortune by the *Sortes Virgilianæ*, a kind of divination anciently made by opening a Virgil. The king opening the book, the paſſage which happened to come up, was that part of Dido's imprecation againſt Æneas, iv. 615, &c. which is thus tranſlated by Dryden.

"Oppreſs'd with numbers in th' unequal field,
"His men diſcourag'd, and himſelf expell'd;
"Let him for ſuccour ſue from place to place,
"Torn from his ſubjects and his ſon's embrace," &c.

K. Charles ſeeming concerned at this accident, lord Falkland would likewiſe try his own fortune, hoping he might fall on ſome paſſage, that could have no relation to his caſe, and thereby divert the king's thoughts from any impreſſion the other might make upon him: but the place lord Falkland ſtumbled upon was ſtill more ſuited to his deſtiny; being the following expreſſions of Evander, upon the untimely death of his ſon Pallas, Æn. xi. 152.

"O Pallas! thou haſt fail'd thy plighted word,
"To fight with caution, not to tempt the ſword,
"I warn'd thee, but in vain: for well I knew
"What perils youthful ardour would purſue;
"That boiling blood would carry thee too far:
"Young as thou wert in dangers, raw to war.
"O curſt eſſay of arms, diſaſt'rous doom,
"Prelude of bloody fields and fights to come!"

He wrote ſeveral pieces, both poetical and political; and in ſome of the king's declarations, ſuppoſed to be penned by lord Falkland, we find the firſt regular definition of the Engliſh conſtitution that occurs in any compoſition publiſhed by authority. His predeceſſor, the firſt viſcount Cary, was ennobled for bringing king James an account of queen Elizabeth's death.

(2.) Cary, Robert, a learned Engliſh chronologer, born in Devonſhire, about A. D. 1615. On the reſtoration, he was preferred to the archdeaconry of Exeter; but was ejected in 1664, and ſpent the reſt of his days at his rectory of Portlemouth, where he died in 1688. He publiſhed *Palælogia Chronica*, a chronology of ancient times, in 3 parts, didactical, apodeictical, and canonical; and tranſlated the hymns of the church into Latin verſe.

CARYA, or } (1.) CARYAE, } a town of Laconia, between Sparta and the borders of Meſſenia: where ſtood a temple of Diana, thence called Caryatis.

(2.) Caryae, a town in Arcadia, towards the borders of Laconia. Whether from this town or the former, (N° 1.) the *Columnæ Caryatides*, of Vitruvius and Pliny, took their appella
puted. See Caryatides.

(1.) CARYATES, in antiquity, a fe
nour of Diana, held at Carya. The
mony was a dance ſaid to have been i
Caſtor and Pollux, and performed by
of the place. During Xerxes's invaſi
conians not daring to appear and ce
cuſtomary ſolemnity, to prevent incurr
ger of the goddeſs by ſuch an interm
neighbouring ſwains are ſaid to have
and ſung *bucoliſmi* or paſtorals, which
have been the origin of bucolic poetry.

(2.) Caryates, an inhabitant of Ca

(3.) * Caryates. } *n. ſ.* [from *Ca*
(1.) * CARYATIDES. } taken by th
who led away the women captives; an
petuate their ſlavery, repreſented them
ings as charged with burdens.] An ord
lumns or pilaſters under the figures o
dreſſed in long robes, ſerving to ſuppor
tures. *Chambers.*

(2.) Caryatides. See Architectu

CARYL, Joſeph, an eminent divine o
century, bred at Oxford, and ſome time
to the ſociety of Lincoln's inn. He was
preacher before the long parliament, a
their books, a member of the aſſembly
and one of the triers for the approbatio
ſters; in all which capacities he ſhowed
man of conſiderable parts and learning,
great zeal againſt the king's perſon and
the reſtoration, he was ſilenced by the a
formity, and lived privately in London
beſides other works, he diſtinguiſhed hin
laborious *Expoſition of the Book of Job;*
in 1672.

CARYLL, John, an Engliſh poet, of
man Catholic perſuaſion, ſecretary to
the wife of James II. and one who foll
fortunes of his abdicating maſter, who
him. He was in England in the reign of
and recommended the ſubject of the *R*
Lock to Mr Pope, who addreſſed it to
was alſo the intimate friend of Pope's *U*
Lady. He was the author of two plays
Engliſh Princeſs, or the Death of Ri
1667, 4to; 2. Sir Salomon, or the Caut
comb, 1671, 4to; and in 1700, he publi
Pſalms of David, tranſlated from the Vulg
In Tonſon's edition of Ovid's Epiſtles
Briſeis to Achilles is by Sir John Caryll
Nichols's Select Collection of Miſcellan
vol. II. p. 1. the firſt Eclogue of Virgil
lated by him. He was living in 1717.
3 of his letters in the Additions to Pop
p. 114.

CARYOCAR, in botany: A genus of
gynia order, belonging to the polyandr
plants. The calyx is quinquepartite,
5, the ſtyles moſt frequently 4. The
plum, with nucleuſſes, and 4 furrows n

CARYOCFS. See Abanga.

CARYOPHYLLATA, the avens. Se

CARYOPHYLLEÆ. See Botany,

(I.) CARYOPHYLLUS, the clove
botany: A genus of the monogynia orde
ing to the polyandria claſs of plants; a

natural method ranking under the 19th order, *Heſperideæ*. The corolla is tetrapetalous; the calyx tetraphyllous; the belly monoſpermous below the receptacle of the flower. Of this there is but one ſpecies, viz.

CARYOPHYLLUS AROMATICUS, which is a native of the Molucca iſlands, particularly of Amboyna, where it is principally cultivated. The clove tree reſembles, in its bark, the olive; and is about the height of the laurel, which it alſo reſembles in its leaves. No verdure is ever ſeen under it. It has a great number of branches, at the extremities of which are produced vaſt quantities of flowers, that are firſt white, then green, and at laſt pretty red and hard. When they arrive at this degree of maturity, they are, properly ſpeaking, *cloves*. As they dry, they aſſume a dark yellowiſh caſt; and, when gathered, become of a deep brown. The ſeaſon for gathering the cloves is from October to February. The boughs of the trees are then ſtrongly ſhaken, or the cloves beat down with long reeds. Large cloths are ſpread to receive them, and they are afterwards either dried in the ſun or in the ſmoke of the bamboo cane. The cloves which eſcape the notice of thoſe who gather them, or are purpoſely left upon the tree, continue to grow till they are about an inch in thickneſs; and theſe falling off, produce new plants, which do not bear in leſs than 8 or 9 years. Thoſe which are called *mother cloves* are inferior to the common ſort; but are preſerved in ſugar by the Dutch; and, in long voyages, eat after their meals, to promote digeſtion The clove, to be in perfection, muſt be full ſized, heavy, oily, and eaſily broken; of a fine ſmell, and of a hot aromatic taſte, ſo as almoſt to burn the throat. It ſhould make the fingers ſmart when handled, and leave an oily moiſture upon them when preſſed. In the Eaſt Indies, and in ſome parts of Europe, it is ſo much admired as to be thought an indiſpenſable ingredient in almoſt every diſh. It is put into their food, liquors, wines, and enters likewiſe the compoſition of their perfumes. Cloves are very hot, ſtimulating, aromatics; and poſſeſs in an eminent degree the general virtues of ſubſtances of this claſs. Their pungency reſides in their reſin; or rather in a combination of reſin with eſſential oil: for the ſpirituous extract is very pungent; but if the oil and the reſin contained in this extract are ſeparated from each other by diſtillation, the oil will be very mild; and any pugency which it does retain, proceeds from ſome ſmall portion of adhering reſin, and the remaining reſin will be inſipid. No plant, or part of any plant, contains ſuch a quantity of oil as cloves do. From 16 ounces Newman obtained by diſtillation two ounces and two drams, and Hoffman obtained an ounce and an half of oil from two ounces of the ſpice. The oil is ſpecifically heavier than water. Cloves acquire weight by imbibing water; and this they will do at ſome conſiderable diſtance. The Dutch, who trade in cloves, make a conſiderable advantage by knowing this ſecret. They ſell them always by weight; and when a bag of cloves is ordered, they hang it, for ſeveral hours before it is ſent in, over a veſſel of water, at about two feet diſtance from the ſurface. This will add many pounds to the weight, which the unwary purchaſer pays for on the ſpot. This is ſometimes practiſed in Europe, as well as in the ſpice iſlands; but the degree of moiſture muſt be more carefully watched in the latter; for there a bag of cloves will, in one night's time, attract ſo much water, that it may be preſſed out by ſqueezing them with the hand. The clove tree is never cultivated in Europe. At Amboyna the company have allotted the inhabitants 4000 parcels of land, on each of which they were at firſt allowed, and about the year 1720 compelled, to plant about 125 trees, amounting in all to 500,000. Each of theſe trees produces annually on an average more than two pound of cloves; and conſequently the collective produce muſt weigh more than a million. The cultivator is paid with the ſpecie that is conſtantly returned to the company, and receives ſome unbleached cottons which are brought from Coromandel.

(II.) CARYOPHYLLUS, the PINK. See DIANTHUS.

(III.) CARYOPHYLLUS, bennet. See GEUM.

CARYOTA, in botany: A genus belonging to the natural order, *Palmæ*, ranked by Linnæus in his *Appendix* to the ſexual ſyſtem. The male calyx is common, the corolla tripartite; the ſtamina very numerous; as well as the female calyx; the corolla tripartite; one piſtil, and a diſpermous berry.

CARYSFORT, a conſiderable borough of Ireland. in the county of Wicklow.

CARYUM, or CARYA. See CARYA.

CARYUS, in botany, a name given by Dioſcorides to the ERYNGIUM, or ſea holly.

(1.) CASA, in old authors, a cottage or houſe.

(2.) CASA DEL CAMPO, a royal ſeat of Spain, in New Caſtile, on the W. ſide of Madrid, oppoſite to the caſtle.

(3.) CASA, SANTA, [*i. e.* the holy chamber,] the chapel of the holy virgin at Loretto. The *Santa Caſa* is believed to be the houſe, or chamber, in which the bleſſed virgin is ſaid to have been born, where ſhe was betrothed to Joſeph, where the angel ſaluted her, and of conſequence where the miraculous conception took place. Of this building the Catholics tell many wonderful and ridiculous ſtories. It conſiſts of one room, 44 ſpans long, 18 broad, and 23 high. Over the chimney, in a niche, ſtands the image called *the great Madona*, 4 feet high, made of cedar, and, as they ſay, wrought by St Luke. The mantle is covered with innumerable jewels of ineſtimable value. She has a crown, given her by Louis XIII. of France, and a little crown for her ſon.

(4.) CASA, John de la, archbiſhop of Benevento, was born at Florence, in 1503. He was educated at Bologna, and afterwards ſettled at Rome, where he was appointed clerk of the apoſtolical chamber, in 1538. While he improved himſelf in cultivating letters, he alſo indulged in ſenſual pleaſures, and had a natural ſon whom he named *Quirino;* but this did not hinder his preferment in the church, for in 1544 he received the archbiſhopric of Benevento, and the ſame year was ſent nuncio to Venice, where he diſplayed great diplomatic abilities. On account of his connection with cardinal Farneſe, he fell into diſgrace under Julius

III. but Paul IV. took him into favour, and made him ſecretary of ſtate. He wrote Galatea, or Art of living in the World; ſeveral beautiful Italian poems; the Lives of Cardinals Contarini and Bembo, &c. He died in 1556. His works which were collected and printed at Venice, in 5 vols. 4to, 1728, ſhow him to have been one of the moſt elegant Italian writers, his Latin poetry being particularly excellent.

CASAC, or Cazac, a country in the dominions of Perſia, on the frontiers of Armenia. It is governed by princes of its own, nominally ſubject to Perſia; and the inhabitants, deſcended from the Coſſacs, are repreſented as a rude and barbarous people. Caſac, or Caſac-Lora is the name of the capital.

CASACORES, a lake of South America, in Paraguay, 100 miles long.

(1.) CASAL, a ſtrong town of Itay in Montferrat, with a citadel and a biſhop's ſee, ſeated on the Po, and included in the late republican dep. of the Adda. It was taken by the French from the Spaniards in 1640; and the duke of Mantua ſold it to the French in 1681. In 1695 it was taken by the allies, who demoliſhed the fortifications; but the French retook it, and fortified it again. The king of Sardinia became maſter of it in 1706, from whom the French took it in 1745; however, the king of Sardinia got poſſeſſion again in 1746. It is 48 miles E. of Turin. Lon. 8. 37. E. Lat. 54. 7. N.

(2.) Casal Maggiore, a ſmall ſtrong town of Italy, in the Milaneſe, ſeated on the river Po, and in the late republican dep. of the Upper Po. Lon. 11. 5. E. Lat. 45. 6. N.

(3.) Casal Nuova, a town of Naples, in Calabria Ulteriore. A terrible earthquake happened here in 1783, by which the princes Gerace, and upwards of 4000 inhabitants loſt their lives. It ſtands near the ſea, 11 miles N. by W. of Oppido.

CASAN, or Kasan. See Kasan.

CASA-NOVA, Marc Antony, a Latin poet, born at Rome, ſucceeded particularly in epigrams. His poems on the illuſtrious men of Rome are alſo much eſteemed. He died in 1527.

CASAS, Bartholomew de las, biſhop of Chiapa, diſtinguiſhed for his humanity and zeal for the converſion of the Indians, was born at Seville in 1474; and went with his father, who failed to America with Chriſtopher Columbus in 1493. At his return to Spain he embraced the ſtate of an eccleſiaſtic, and obtained a curacy in the iſland of Cuba; but ſome time after quitted his cure, in order to procure liberty for the Indians, whom he ſaw treated by the Spaniards in the moſt cruel and barbarous manner, which naturally gave them an unconquerable averſion to Chriſtianity. Las Caſas exerted himſelf with extraordinary zeal, for 50 years together, in his endeavours to perſuade the Spaniards that they ought to treat the Indians with equity and mildneſs; for which he ſuffered much perſecution from his countrymen. At laſt the court, moved by his continual remonſtrances, made laws in favour of the Indians, and ordered the governors to ſee them executed. See Mexico. He died at Madrid in 1566, aged 92. He wrote ſeveral works full of humanity and virtue. The principal of them are, 1. An account of the deſtruction of the Indies. 2. Several treaties in favour of the Indies, againſt Dr Sepulveda, who wrote a book to juſtify the inhuman barbarities committed by the Spaniards. 3. A very curious, and now ſcarce, work in Latin, on this queſtion, "Whether kings or princes can, conſiſtently with conſcience, or in virtue of any right or title, alienate their ſubjects, and place them under the dominion of another ſovereign?"

CASATI, Paul, a learned Jeſuit, born at Placentia in 1617. After having taught mathematics and divinity at Rome, he was ſent into Sweden to queen Chriſtina, whom he prevailed on to embrace the popiſh religion. He wrote, 1. *Vacuum proſcriptum.* 2. *Terra machinis mota.* 3. *Mechanicorum libri octo.* 4. *De Igne Diſſertationes;* which is much eſteemed. 3. *De Angelis Diſputatio Theolog.* 6. *Hydroſtaticæ Diſſertationes.* 7. *Opticæ Diſputationes.* It is remarkable that he wrote this treatiſe on optics at 88 years of age, and after he was blind. He alſo wrote ſeveral books in Italian.

(1.) CASAUBON, Iſaac, a learned divine and critic, born at Geneva, in 1559. He was choſen profeſſor of Greek at Geneva, when only 23 years of age, and in 1586 he married a daughter of Henry Stephens, the learned printer, by whom he had 20 children. Having continued at Geneva about 12 years, he afterwards went to fill the profeſſor's chair at Montpelier; but here his ſituation not being agreeable, he removed to Paris, in hopes of a profeſſorſhip which was promiſed him, but which he never obtained; and though a penſion was granted him it was ill paid. In 1600, he was one of the judges on the proteſtant ſide, in the conference between cardinal du Perron and du Pleſſis Mornay, and gave his voice againſt the latter, from which it was thought he was going to change his religion; and cardinal du Perron was directed to communicate with him in that view; but the reſult was the inflexible reſolution of Caſaubon to hold by the proteſtant principles. His penſion, however, was increaſed, and he was appointed librarian to the king in 1603. After the death of Henry IV. he went to England with Sir Henry Wotton, ambaſſador from king James I, where he was kindly received. King James ſettled a conſiderable penſion on him, and gave him a prebend at Weſtminſter and another at Canterbury. He died in 1614, and was interred in Weſtminſter abbey, where a monument was erected to him. He was greatly ſkilled in the Greek; and beſides publiſhing valuable editions of many ancient authors, he wrote *De Libertate Eccleſiaſtica,* which, being offenſive to the pope, was ſuppreſſed by Henry IV; *De Rebus Sacris Eccleſiaſticis,* being a criticiſm on Baronius; *Epiſtolæ,* the beſt edition of which is that of Almeloveen at Rotterdam, fol. 1709. Caſaubon received the higheſt eulogiums from his cotemporaries.

(2.) Casaubon, Meric, the ſon of Iſaac, (N° 1.) was born at Geneva in 1599. He was bred at Oxford, and took the degree of M. A. in 1621. The ſame year he publiſhed a book in defence of his father againſt the calumnies of certain Roman Catholics; which gained him the favour of king James I. and a conſiderable reputation abroad. He was made prebendary of Canterbury by archbiſhop Laud. In the beginning of the civil war he loſt all his promotions, but ſtill continued to publiſh excellent works. Oliver Cromwell, then lieutenant-general of the parliament's forces, would have employed him in writing the hiſtory of the war; but he declined it, owning, that his ſubject would oblige him to make ſuch reflections as would be ungrateful, if not injurious, to his lordſhip. Notwithſtanding this anſwer, Cromwell, ſenſible of his worth, ordered 300l. or 400l. to be paid him by Cromwell, a bookſeller in London, on demand, without requiring from him any acknowledgment. But this offer he rejected, though his circumſtances were then mean. At the ſame time it was propoſed by his friend Mr Greaves, who belonged to the library at St James's, that if Caſaubon would gratify Cromwell, all his father's books, (which were then in the royal library, having been purchaſed by K. James,) ſhould be reſtored to him, and a penſion of 300l. a-year paid to the family, as long as the youngeſt ſon of Dr Caſaubon ſhould live; but this alſo was refuſed. He likewiſe refuſed handſome offers from Chriſtina queen of Sweden, being determined to ſpend the remainder of his life in England. At the reſtoration he recovered all his preferments, and continued writing till his death in 1671. He was the author of an Engliſh tranſlation of Antoninus's Meditations, and of Lucius Florus; editions of ſeveral of the claſſics, with notes; a treatiſe of uſe and cuſtom; a treatiſe of enthuſiaſm: with many other works; and he left a number of MSS. to the univerſity of Oxford.

CASAURINA. See CASUARINA.

CASBIN, or CASWIN, a large trading city of Perſia, in Irac Agemi; 185 miles N. of Iſpahan. Lon. 48. 10. E. Lat. 36. 5. N.

CASCABLE, the knob or button of metal behind the breech of a cannon, as a ſort of handle whereby to elevate and direct the piece. The neck of the caſcable is the part which joins it to the breech-mouldings; its diameter is ½ of a calibre; that of the button ſomething more than a calibre. The length of the caſcable is always two calibres and a quarter.

(1.) * CASCADE. *n. ſ.* [*caſcade*, Fr. *caſcata*, Ital. from *caſcare*, to fall.] A cataract; a waterfall.—The river Teverone throws itſelf down a precipice, and falls by ſeveral *caſcades* from one rock to another, till it gains the bottom of the valley. *Addiſon.*

(2.) CASCADES are either natural, as that at Tivoli, &c. or artificial, as thoſe at Verſailles, &c. and either fall with gentle deſcent, as thoſe of Sceaux; or in form of a buffet, as at Trianon; or down ſteps, in form of perron, as at St Cloud; or from baſon to baſon, &c.

CASCAES, or CASCAIS, } a town of Portugal, in Eſtremadura, ſeated at the mouth of the Tagus, 17 miles E. of Liſbon. Lon. 10. 15. W. Lat. 38. 40. N.

CASCARAGAN, a town of Ireland, in Leitrim.

CASCARILLA. See CLUTIA and CROTON.

CASCHAU, or CASCHAW, } a royal free town and fortreſs of Upper Hungary, ſeated on the Kundert. It is ſurrounded with 3 walls, a ditch and bulwarks, and has often changed its maſters. It is 75 miles E. of Buda. Lon. 20. 36. E. Lat. 40. 15. N.

CASCHROM, a kind of lever, or crooked ſpade, uſed inſtead of the plough, upon rocky ground, in the iſland of Barray. See BARRAY, N° 1.

CASCO BAY, a bay of the United States, on the coaſt of the diſtrict of Maine, which, according to Dr Morſe, extends 40 miles, from Cape Elizabeth on the SW. to Cape Small Point on the NE. and contains about 300 iſlands, ſome of which are inhabited, and almoſt all cultivated, the land being fertile.

(1.) * CASE. *n. ſ.* [*caiſſe*, Fr. a box.] 1. Something that covers or contains any thing elſe; a covering; a box; a ſheath.—The body is but a *caſe* to this vehicle. *Broome on the Odyſſey.*—

Juſt then Clariſſa drew, with tempting grace,
A two-edg'd weapon from her ſhining *caſe.*
Pope.

2. The outer part of a houſe or building.—The *caſe* of the holy houſe is nobly deſigned, and executed by great maſters. *Addiſon on Italy.* 3. A building unfurniſhed.—He had a purpoſe likewiſe to raiſe, in the univerſity, a fair *caſe* for books, and to furniſh it with choice collections from all parts of his own charge. *Wotton.*

(2.) * CASE. *n. ſ.* [*caſus*, Latin.] 1. Condition with regard to outward circumſtances.—Theſe were the circumſtances under which the Corinthians then were, and the argument which the apoſtle advances, is intended to reach their particular *caſe. Atterbury.*—My youth may be made, as it never fails in execution, a *caſe* of compaſſion. *Pope.* 2. State of things.—Here was the *caſe;* an army of Engliſh, waſted and tired with a long winter's ſiege, engaged an army of a greater number than themſelves, freſh and in vigour. *Bacon.*—Your parents did not produce you much in the world, whereby you have fewer ill impreſſions; but they failed, as is generally the *caſe*, in too much neglecting to cultivate your mind. *Swift.* 3. [In phyſick.] State of the body; ſtate of the diſeaſe.—It was well; for we had rather meet with calms and contrary winds, than any tempeſts; for our ſick were many, and in very ill *caſe. Bacon.*—Chalybeate water ſeems to be a proper remedy in hypochondriacal *caſes. Arbuthnot.* 4. Hiſtory of a diſeaſe. 5. The ſtate of facts juridically conſidered: as, the lawyers cited many *caſes* in their pleas.—If he be not apt to beat over matters, and to call up one thing, to prove and illuſtrate another, let him ſtudy the lawyers *caſes:* ſo every defect of the mind may have a ſpecial receipt. *Bacon's Eſſays.* 6. In ludicrous language, condition with regard to leanneſs, or fat. *In caſe*, is *luſty* or *fat.*—Thou lieſt, moſt ignorant monſter, I am *in caſe* to juſtle a conſtable. *Shak. Tempeſt.*—Pray have patience till then, and when I am *in* little better *caſe*, I'll throw myſelf in the very mouth of you. *L'Eſtrange.* 7. Contingence; poſſible event.—The atheiſt, in caſe things ſhould fall out contrary to his belief or expectation, hath made no proviſion for this *caſe;* if, contrary to his confidence, it ſhould prove in the iſſue that there is a God, the man is loſt and undone for ever. *Tillotſon.* 8. Queſtion, relating to particular perſons or thing.—Well do I find each man wiſe in his own *caſe. Sidney.* 9. Repreſentation of any fact or queſtion. 10. The variation of nouns.—The ſeveral changes which the noun undergoes in the Latin and Greek tongues, in the ſeveral numbers, are called *caſes*, and are deſigned to expreſs the ſeveral views or relations under which the mind conſiders things with regard to one another; and the variation of the noun for this purpoſe is called declenſion. *Clark's Latin Grammar.* 11. *In caſe.* [*in caſo*, Ital.] If it ſhould happen; upon the ſuppoſition that: a form of ſpeech now little uſed.—For *in caſe* it be certain, hard it cannot be for them to ſhew us where we ſhall find it; that we may ſay theſe were the orders of the apoſtles. *Hooker.*

(3.) Case, in grammar. See § 2. *def.* 10. and the article Grammar.

(4.) Case, in printing, a large flat oblong frame placed aſlope, divided into ſeveral little ſquare cells; in each of which are lodged a number of types of the ſame kind, whence the compoſitor takes them out, as he needs them, to compoſe his matter. See Printing.

(5.) Case is alſo uſed for a certain numerous quantity of divers things. Thus a caſe of crown glaſs contains uſually 24 tables, each table being nearly circular, and about 3 feet 6 inches diameter; of Newcaſtle glaſs, 35 tables; of Normandy glaſs, 25.

(1.) * *To* Case. *v. a.* [from the noun.] 1. To put in a caſe or cover.—*Caſe* ye, *caſe* ye; on with your vizours; there's money of the king's coming down the hill. *Shakeſpeare's Henry* IV. 2. To cover as a caſe.—

Then comes my fit again, I had elſe been perfect;
As broad, and gen'ral as the *caſing* air,
To ſaucy doubts and fears. *Shak. Macbeth.*

3. To cover on the outſide with materials different from the inſide.—Then they began to *caſe* their houſes with marble. 4. To ſtrip off the covering; to take off the ſkin.—We'll make you ſome ſport with the fox ere we *caſe* him. *Shak.*

(2.) * *To* Case. *v. n.* To put caſes; to contrive repreſentations of facts: a ludicrous uſe.—They fell preſently to reaſoning and *caſing* upon the matter, with him, and laying diſtinctions before him. *L'Eſtrange.*

* *To* CASEHARDEN. *v. a.* [from *caſe* and *harden.*] To harden on the outſide.—The manner of *caſehardening* is this: Take cow horn or hoof, dry it thoroughly in an oven, then beat it to powder; put about the ſame quantity of bay ſalt to it, and mingle them together with ſtale chamber lye, or elſe white wine vinegar. Lay ſome of this mixture upon loam, and cover your iron all over with it; then wrap the loam about all, and lay it upon the hearth of the forge to dry and harden. Put it into the fire, and blow up the coals to it, till the whole lump have juſt a blood-red heat. *Moxon's Mech. Exerciſes.*

CASE-HARDENING is a ſuperficial converſion of iron into ſteel, by cementation with vegetable or animal coals. See laſt article. This operation is generally practiſed upon ſmall pieces of iron wrought into tools and inſtruments to which a ſuperficial converſion is ſufficient: and may be performed conveniently by putting the pieces of iron to be caſe-hardened, together with the cement, into an iron box, which is to be cloſely ſhut and expoſed to a red heat for ſome hours. By this cementation a certain thickneſs from the ſurface of the iron will be converted into ſteel, and a proper hardneſs may be afterwards given by ſudden extinction of the heated pieces of converted iron in a cold fluid. See Steel.

CASEI di cavallo, a peculiar kind of cheeſe, famous in Italy and many other places, made of the milk of the female buffalo, that ſpecies being as commonly tamed and kept there, as the ox and heifer with us.

* CASE-KNIFE. *n. ſ.* [from *caſe* and *knife.*] A large kitchen knife.—The king always acts with a great *caſe-knife* ſtuck in his girdle, which the lady ſnatches from him in the ſtruggle, and ſo defends herſelf. *Addiſon on Italy.*

* CASEMATE. *n. ſ.* [from *caſa armata*, Ital. *caſamata*, Span. a vault formerly made to ſeparate the platforms of the lower and upper batteries] 1. [In fortification.] A kind of vault or arch of ſtone-work, in that part of the flank of a baſtion, next the curtin, ſomewhat retired and drawn back towards the capital of the baſtion, ſerving, as a battery, to defend the face of the oppoſite baſtion, and the moat or ditch. *Chambers.* 2. The well, with its ſeveral ſubterraneous branches, dug in the paſſage of the baſtion, till the miner is heard at work, and air given to the mine. *Harris.*

(1.) * CASEMENT. *n. ſ.* [*caſamento*, Ital.] A window opening upon hinges.—Why, then may you have a *caſement* of the great chamber window, where we play, open, and the moon may ſhine in at the *caſement*. *Shakeſp.*—There is as much difference between the clear repreſentations of the underſtanding then, and the obſcure diſcoveries that it makes now, as there is between the proſpect of a *caſement* and a key-hole. *South.*

(2.) Casement, or Casemate, in architecture, a hollow moulding, which ſome architects make one 6th of a circle and others one 4th. Alſo a little moveable window, uſually within a larger.

* CASEOUS. *adj.* [*caſeus*, Lat.] Reſembling cheeſe; cheeſy.—Its fibrous parts are from the *caſeous* parts of the chyle. *Floyer on Humours.*

(1.) * CASERN. *n. ſ.* [*caſerne*, Fr.] A little room or lodgement erected between the rampart and the houſes of fortified towns, to ſerve as apartments or lodgings for the ſoldiers of the garriſon, with beds. *Harris.*

(2.) Caserns have uſually two beds in each, for ſix ſoldiers, who mount guard alternately; the third part being always on duty.

(1.) CASERTA, a mountain of Naples, in Terra di Lavoro.

(2.) Caserta, an epiſcopal town of Naples, at the foot of the mountain, (N° 1.) 16 miles N. of Naples. Lon. 15. 15. E. Lat. 41. 20. N.

CASES, Peter-James, of Paris, the moſt eminent painter of the French ſchool; the churches of Paris and of Verſailles abound with his works. He died in 1754, aged 79.

* CASE-SHOT. *n. ſ.* [from *caſe* and *ſhot.*] Bullets incloſed in a caſe.—In each 7 ſmall braſs and leather guns, charged with *caſe-ſhot*. *Clarendon.*

* CASEWORM. *n. ſ.* [from *caſe* and *worm.*] A grub that makes itſelf a caſe.—Cadiſes, or *caſeworms*, are to be found in this nation, in ſeveral diſtinct counties and in ſeveral little brooks. *Floyer.*

(1.) CASH, a town of Ireland in the county of Farmanagh, Ulſter.

(2.) * Cash. *n. ſ.* [*caiſſe*, Fr. a cheſt.] Money; properly ready money; money in the cheſt, or at hand.—He is at an end of all his *caſh*, he has both his law and his daily bread now upon truſt. *Arbuthnot's John Bull.*—

He ſent the thief, that ſtole the *caſh*, away,
And puniſh'd him that put it in his way. *Pope.*

(3.) Cash, in a commercial ſtyle, ſignifies the ready money which a merchant or other perſon has in his preſent diſpoſal to negociate. M. Savary ſhows, that the management of the caſh of a company is the moſt conſiderable article, and that whereon its good or ill ſucceſs chiefly depends.

CASHAN. See Cachan.

CASH-BOOK. See Book-keeping, *Index*.

CASHEL, or Cashil, a town of Ireland, in the county of Tipperary, Munſter, with an archbiſhop's ſee. The ruins of the old cathedral ſhow that it has been an extenſive Gothic ſtructure, boldly towering on the celebrated rock of Caſhel, which taken together form a magnificent object. It is ſeen at a great diſtance, and in many directions. Adjoining to it are the ruins of the chapel of Cormac M'Cullinan. See Cormac. It is ſuppoſed to have been the firſt ſtone building in Ireland, and ſeems, by its rude imitation of pillars and capitals, to have been copied after the Grecian architecture, and to have long preceded that which is uſually called *Gothic*. On the top of the rock of Caſhel, and adjoining the cathedral, is a lofty round tower, which proudly defied the too ſucceſsful attempts of Abp. Price, who unroofed and thereby demoliſhed the ancient cathedral founded by St Patrick. In the choir are the monuments of Myler Magrath, Abp. of this ſee, in the reign of queen Eliſabeth, and ſome other curious remains of antiquity. Caſhel was formerly the royal ſeat and metropolis of the kings of Munſter; and on the aſcent to the cathedral is a large ſtone, on which every new king of Munſter was, as tradition ſays, ſolemnly proclaimed. The archbiſhop's palace is a fine building. Here is a very handſome market houſe, a ſeſſions houſe, the county infirmary, a charter ſchool for 20 boys and 20 girls, and a very good barrack for two companies of foot. Dr Agar, ſome years ago, finiſhed a very elegant church begun by his predeceſſor. Lon. 7. 36. W. Lat. 52. 16. N.

CASHELLS, a hill in Angus-ſhire.

(1.) * CASHEWNUT. *n. ſ.* A tree that bears nuts, not ſhells, but huſks. *Miller.*

(2.) Cashew nut. See Anacardium.

CASHGUR. See Buckharia, N° 2, 3, and Kashgur.

CASHI, a ſmall river of N. Carolina, which riſes in Bertie county, and after running SE. falls into the Roanoke, about 7 miles above Albemarle Sound, and 3 above the Devil's Elbow.

(1.) * CASHIER. *n. ſ.* [from *caſh*.] He that has charge of the money.—If a ſteward or *caſhier* be ſuffered to run on, without bringing him to a reckoning, ſuch a ſottiſh forbearance will teach him to ſhuffle. *South.*

(2.) Cashiers of the bank, are officers who ſign the notes that are iſſued out, examine and mark them when returned for payment, &c.

* *To* Cashier. *v. a.* [*caſſers*, Fr. *caſſare*, Lat.] 1. To diſcard; to diſmiſs from a poſt, or a ſociety, with reproach.—They have already *caſhiered* ſeveral of their followers as mutineers. *Addiſon.*

The ruling rogue, who dreads to be *caſhier'd*,
Contrives, as he is hated, to be fear'd. *Swift.*

2. It ſeems, in the following paſſages, to ſignify the ſame as to annul; to vacate; which is ſufficiently agreeable to the derivation.—If we ſhould find a father corrupting his ſon, or a mother her daughter, we muſt charge this upon a peculiar anomaly and baſeneſs of nature; if the name of nature may be allowed to that which ſeems to be utter *caſhiering* of it, and deviation from, and a contradiction to, the common principles of humanity. *South.*—Some *caſhier*, or at leaſt endeavour to invalidate, all other arguments, and forbid us to hearken to thoſe proofs, as weak or fallacious. *Locke.*

CASHIN, a river of Ireland, in Kerry.

CASHIOBURY, a town in Hertfordſhire, near Watford, 16 miles N. of London.

* CASH-KEEPER. *n. ſ.* [from *caſh* and *keep*.] A man entruſted with the money.—Diſpenſator was properly a *caſhkeeper*, or privy-purſe. *Arbuthnot on Coins.*

CASHMERE, or (1.) CASHMIRE, a province of Hindooſtan Proper, ſubject to the king of Candahar. It is bounded on the W. by the Indus, on the N. by the Indian Caucaſus, and on the E. and S. by Lahore. The country is celebrated for its romantic beauties, the fertility of its ſoil, and the temperature of the atmoſphere. It is an elevated and extenſive valley, ſurrounded by ſteep mountains, that tower above the regions of ſnow; and its ſoil is compoſed of the mud depoſited by a large river, which originally formed its waters from a lake, that covered the whole valley, until it opened itſelf a paſſage through the mountains, and left this fertilized valley an ample field to human induſtry. "Although this account," ſays major Rennel, "has no living teſtimony to ſupport it, yet hiſtory and tradition, and, what is yet ſtronger, appearances, have impreſſed a conviction of its truth on the minds of all who have viſited the ſcene, and contemplated the different parts of it." The periodical rains, which almoſt deluge the reſt of India, are ſhut out of Caſhmere by the height of the mountains, ſo that only light ſhowers fall there. Theſe, however, are ſufficiently abundant to fill ſome thouſands of caſcades, which are precipitated into the valley, from every part of the ſtupendous and romantic bulwark that encircles it. The ſoil is the richeſt that can be conceived, and its productions thoſe of the temperate zone. A vaſt number of ſtreams from all quarters of the valley run into the Chelum. Many ſmall lakes are ſpread over the ſurface, and ſome of them contain floating iſlands. In a word the ſcene is beautifully pictureſque, and a part of the romantic circle of mountains make up a portion of every landſcape. The ſuperſtition of the inhabitants has multiplied the places of worſhip of Mahadeo, Beſchau, and Brama. All Caſhmere is holy land, and miraculous fountains abound. But to one dreadful evil they are often ſubject, namely, earthquakes; and, to guard againſt their moſt terrible effects, all their houſes are built of wood. Among other curious manufactures of Caſhmere is that of ſhawls, which are diſtributed all over the weſtern and ſouthern Aſia. They make a part of the dreſs of the Egyptian Mamalouks, as well as of the Britiſh fair. The delicate wool of which they are made, is the produce of a ſpecies of goat of this country, or of Thibet. Here are bred a ſpecies of ſheep, called HUNDOO, which, like thoſe of Peru, are employed in carrying burdens. In fine, to uſe the words of an oriental writer, "Caſhmere is a garden in perpetual ſpring." It is 80 miles long and 40 broad.

(2.) CASHMIRE, a large city of Hindooſtan Proper, capital of the province, N° 1. It is built on both ſides of the river Chelum, and is 285 miles E. by S. of Cabul. Lon. 73. 11. E. Lat. 33. 49. N.

CASHMIREANS, the inhabitants of Caſhmire, ſeem a race diſtinct from all others in the Eaſt; their perſons are more elegant, and their complexions more delicate, and more tinged with red. They have a language of their own, ſaid to be older than that of the Shanſcrit. They are ſprightly and ingenious; and have ſeveral curious manufactures much valued in India. They are all either Mahometans or Idolaters; ſome ſay the latter have a religion different from that of the Hindoos.

CASHMORE, a town near Chettle, Dorſetſh.

(1.) CASHNA, an extenſive empire of Africa, called SOUDAN by the Arabs, and NIGRITIA, by the Europeans. It is part of the region called Negroe-land, and is bounded on the N. by Fezzan and Zahara, E. by Zamphara and Bornou, and S. by the Niger. It reſembles Bornou in climate, ſoil, and natural productions, and in the colour, genius, religion, and government of the people. The rains, indeed, are leſs violent than thoſe of Bornou. Monkies and parrots, (but ſeldom ſeen in Bornou,) are numerous and of various ſpecies. The common people are leſs courteous in Caſhna than in Bornou: 1000 towns and villages are ſaid to be included in this empire.

(2.) CASHNA, the chief city of the above empire; (N° 1.) 370 miles S. by W. of Meſſurata. Lat. 16. 20 N.

CASHOO, a medicinal and aromatic drug, uſed in Hindooſtan, by the natives, who chew it either alone, or mixed with areca. It is extracted from a tree called CATEE, by decoction, maceration, and evaporation. It is ſaid to ſtrengthen the ſtomach, ſweeten the breath, ſtop coughing, faſten looſe teeth, &c. Kempfer ſays it is prepared at Odowara, in the various forms of pills, flowers, ſmall idols, &c.

CASHOP, a village 3 miles from Durham.

CASI, in the Perſian police, one of the two judges under the nadab, who decide all religious matters, grant divorces, &c. and have deputies in all cities of the kingdom.

CASIA. See CASSIA.

CASIMER. See CASSIMER.

(1.) CASIMIR, Matthias Sorbiewſki, a Poliſh Jeſuit, born in 1597. He was a moſt excellent poet. His odes, epodes, and epigrams, have been thought equal to thoſe of the fineſt wits of Greece and Rome. Dr Watts has tranſlated one or two of his ſmall pieces, which are added to his Lyric Poems. He died at Warſaw in 1640, aged 43. The beſt edition of his poems is that of Paris, 1759.

(2—5.) CASIMIR, the name of 4 kings of Poland. See POLAND, HISTORY OF.

CASIMUL, a village in Dorſetſhire, in the pariſh of Whitchurch.

CASING OF TIMBER WORK, among builders, is the plaſtering the houſe all over the outſide with mortar, and then ſtriking it while wet by a ruler, with the corner of a trowl, to make it reſemble the joints of free-ſtone. Some direct it to be done upon heart laths, becauſe the mortar would, in a little time, decay the ſap laths; and to lay on the mortar in two thickneſſes, *viz.* a ſecond before the firſt is dry.

CASIO, a village of Italy, in the late Bologneſe and Italian republic, ſituated on the river and dep. of the Reno.

CASIPHIA, in ancient geography, a place near Babylon: *Ezra*, viii. 17. From the ſimilarity of the name ſome have ſuppoſed it to lie on the coaſt of the Caſpian ſea, but its diſtance renders this not probable.

CASIUS MONS, a hill in Paleſtine near Egypt, where Jupiter had a temple, and Pompey a tomb.

(1.) * CASK. *n. ſ.* [*caſque*, Fr. *cadus*, Lat.] 1. A barrel; a wooden veſſel to ſtop up liquor or proviſions.—The patient turning himſelf abed, it makes a fluctuating kind of noiſe, like the rumbling of water in a *caſk*. *Harvey.* 2. It has *caſk* in a kind of plural ſenſe, to ſignify the commodity or proviſion of caſks.—Great inconveniencies grow by the bad *caſk* being commonly ſo ill ſeaſoned and conditioned, as that a great part of the beer is ever loſt and caſt away. *Raleigh.*

(2.) * CASK. CASQUE *n. ſ.* [*caſque*, Fr. *caſſis*, Lat.] A helmet; armour for the head: a poetical word.—

Let thy blows, doubly redoubled,
Fall like amazing thunder on the *caſque*
Of thy pernicious envy. *Shak.*
Why does he load with darts
His trembling hands, and cruſh beneath a *caſk*
His wrinkled brows? *Addiſon.*

(3.) CASK. See § 2, and HELMET. Le Gendre obſerves, that anciently, in France, the gens d'arms all wore CASQUES. The king wore a caſque gilt; the dukes and counts ſilvered; gentlemen poliſhed ſteel; and the reſt plain iron. The caſk is frequently on ancient medals, where we may obſerve great varieties in its form and faſhion; as Greek, Roman, &c. F. Joubert makes it the moſt ancient covering of the head, as well as the moſt univerſal. Kings, emperors, and gods are ſeen with it. That which covers the head of Rome has uſually two wings like thoſe of Mercury: and that of ſome kings is furniſhed with horns like thoſe of Jupiter Ammon; and ſometimes bulls or rams horns, to expreſs uncommon force.

(4.) CASK, in heraldry. See HERALDRY, *Index.*

(5.) CASKS, (§ 1. *def.* 1.) are uſed for preſerving liquors of divers kinds; or dry goods, as ſugar, almonds, &c. A caſk of ſugar contains from 8 to 11 cwt. A caſk of almonds about 3 cwt.

(1.) * CASKET. *n. ſ.* [a diminutive of *caiſſe*, a cheſt, Fr. *caſſe*, *caſſette*.] A ſmall box or cheſt for jewels, or things of particular value.—

This *caſket* India's glowing gems unlocks, And all Arabia breathes from yonder box. *Pope.*

(2.) CASKET. See CABINET, § 2.

(3.) CASKETS, in the ſea language, are ſmall ropes made of finnet, and faſtened to gromets, or little rings upon the yards, to make faſt the ſail to the yard when it is to be furled.

* *To* CASKET. *v. a.* [from the noun] To put in a caſket.—I have writ my letters, *caſketed* my treaſure, and given order for our horſes. *Shak.*

CASLEU, in chronology. See CISLEU.

CASLEY, a village E. of Otley, Yorkſhire.

CASLON, William an eminent letter-founder, born in 1692, in Hales Owen, Shropſhire. Though he juſtly attained the character of being the Coryphæus in that employment, he was not brought up to the buſineſs. Mr Caſlon ſerved an apprenticeſhip to an engraver of ornaments on gun-barrels; and carried on this trade in Vine-ſtreet, near the Minories. He alſo exerciſed his ingenuity in making tools for the book-binders, and for the chaſing of ſilver plate. While he was thus engaged, Mr Bowyer accidentally ſaw, in a bookſeller's ſhop, the lettering of a book uncommonly neat; (See BOWYER, N° 3.) and inquiring who the artiſt was who made the letters, was led to cultivate an acquaintance with him. Not long after, Mr Bowyer took him to ſee Mr James's foundery. Caſlon had never before ſeen any part of the buſineſs; and being aſked by his friend, if he thought he could cut types, he requeſted a day to conſider the matter, and then replied, that he had no doubt but he could. Upon this Meſſrs Bowyer, Bettenham, and Watts had ſuch a confidence in his abilities, that they lent him 500l. to begin the undertaking, and he applied himſelf to it with equal aſſiduity and ſucceſs. In 1720, the Society for promoting Chriſtian knowledge, in conſequence of a repreſentation from Mr Solomon Negri, a native of Damaſcus in Syria, who was well ſkilled in the Oriental tongues, and had been profeſſor of Arabic, deemed it expedient to print, for the uſe of the Eaſtern churches, the New Teſtament and Pſalter in the Arabic language. Theſe were intended for the benefit of the poor Chriſtians in Paleſtine, Syria, Meſopotamia, Arabia, and Egypt, the conſtitution of which countries did not permit the exerciſe of the art of printing. Upon this occaſion Mr Caſlon was pitched upon to cut the fount; in his ſpecimens of which he diſtinguiſhed it by the name of Engliſh Arabic. He arrived at length to ſuch perfection in type founding, that he not only freed us from the neceſſity of importing types from Holland, but, in the beauty and elegance of thoſe made by him, he ſo far exceeded the productions of the beſt artificers, that his types were frequently exported to the Continent; and his foundery became the moſt capital one in Europe. He died in 1766.

CASLONA, a town of Spain, in Eſtremadura, 5 miles NW. of Baeza.

CASMILUS, one of the 4 great gods of the Samothracians. See CABIRI, and CABIRIA.

CASONE, a town of Italy, ſituated on the Po, in the ci-devant territory of the Paveſan, and republican dep. of Teſſine.

CASPE, a town of Spain, in Arragon, where Ferdinand IV. was elected king of Arragon. It ſtands at the confluence of the Guadaloupe and Ebro, 35 miles S. of Balbaſto, and 44 SE. of Saragoſſa.

CASPEAN, a lake of Vermont.

CASPIAN SEA, a large lake of ſalt water in Aſia, bounded by the province of Aſtracan on the N. and by Perſia on the SE. and W. It is upwards of 400 miles long from S. to N. and 300 broad. It forms ſeveral gulfs, and contains between Aſtracan and Aſtrabad an incredible number of ſmall iſlands. Its bottom is mud, but ſometimes mixed with ſhells. At the diſtance of ſome miles from land it is 500 fathoms deep; but on approaching the ſhore it is every where ſo ſhallow, that the ſmalleſt veſſels, if loaded, are obliged to remain at a diſtance. Being incloſed on all ſides by land, and its banks being in the neighbourhood of very high mountains, its navigation is perfectly different from that of every other ſea. Certain winds domineer over it with ſuch abſolute ſway, that veſſels are often deprived of every reſource; and in its whole extent there is not a port that can be called ſafe. The N. the NE. and E. winds blow frequently, and occaſion moſt violent tempeſts. Along the eaſtern ſhore the E. winds prevail; for which reaſon veſſels bound from Perſia to Aſtracan always direct their courſe along this ſhore. Although the extent of this Sea is immenſe, the variety of its productions is exceedingly ſmall. This undoubtedly proceeds from its want of communication with the ocean, which cannot impart to it any portion of its inexhauſtible ſtores. But the animals which this lake nouriſhes multiply to ſuch a degree, that the Ruſſians, who alone are in condition to make them turn to account, juſtly conſider them as a never failing ſource of profit and wealth. Its fiſheries make the ſole occupation and principal trade of the people inhabiting the banks of the Wolga and the Jaik. Salmon, ſturgeon and other fiſh abound in all parts of the Caſpian, as well as in the rivers that communicate with it, and which they aſcend at ſpawning time. Seals are the only quadrupeds that inhabit it, and are extremely numerous. The varieties of the ſpecies are diverſified, however, only by the colour. Some are quite black, others quite white; ſome whitiſh; ſome yellowiſh, ſome of a mouſe colour, and ſome ſtreaked like a tiger. See PHOCA. They crawl upon the iſlands, where the fiſhermen, kill them with long clubs. One is hardly diſpatched, when others come to his aſſiſtance and ſhare his fate. They are exceedingly tenacious of life, and endure more than 30 hard blows before they die. They will even live for ſeveral days after having received many mortal wounds. They are moſt terrified by fire and ſmoke; and as ſoon as they perceive them, retreat with the utmoſt expedition to the ſea. Theſe animals grow ſo very fat, that they look rather like oil bags than animals. At Aſtracan a ſort of grey ſoap is made of their fat mixed with potaſhes, which is much valued for its property of cleanſing and taking greaſe from woollen ſtuffs. The greateſt numbers are killed in ſpring and autumn. Many ſmall veſſels go from Aſtracan merely to catch ſeals. The only ſhell fiſh, found in the Caſpian, are 3 or 4 ſpecies of cockle, the common muſcle, ſome ſpecies of ſnails, and one or two others. It abounds, however, in birds of different kinds. Many ſpecies of geeſe, ducks, ſtorks, herons, crows, &c. frequent the ſhores. Of birds properly aquatic, it contains the grebe, the creſted diver, the pelican, the cormorant, and almoſt every ſpecies of gull. The waters of this lake are very impure, the nature of its bottom, affecting it greatly. In general, indeed. the waters are ſalt; but though the whole weſtern ſhore extends from 46° to 35° Lat. N. and though one might conclude from analogy that theſe waters would contain a great deal of ſalt, yet experiments prove the contrary: and it is certain that the ſaltneſs of this ſea is diminiſhed by the N. the NE. and NW. winds. The depth as well as the ſaltneſs of theſe waters diminiſhes gradually towards the ſhores; the N. winds often cauſing the rivers to diſcharge into it vaſt quantities of troubled water impregnated with clay. Theſe variations, which the ſea is expoſed to, are more or leſs conſiderable according to the nature of the winds; they affect the colour of the river waters to a certain diſtance from the ſhore, till theſe mixing with thoſe of the ſea, which then reſume the aſcendency, the fine green colour appears, which is natural to the ocean. It is well known, that beſides its ſalt taſte, all ſea water has a ſenſible bitterneſs, which muſt be attributed not only to the ſalt itſelf, but to the mixture of different ſubſtances that unite with it, particularly to different ſorts of alum, the ordinary effect of different combinations of acids. Beſides this, the waters of the Caſpian have another taſte, bitter too, but quite diſtinct, which affects the tongue with an impreſſion ſimilar to that made by the bile of animals; a property which is peculiar to this ſea, though not equally perceptible at all ſeaſons. When the N. and NW. winds have raged for a conſiderable time, this bitter taſte is ſenſibly felt; but when the wind has been S. very imperfectly. To account for this phenomenon, we muſt obſerve, that the Caſpian is ſurrounded on its W. ſide by the mountains of Caucaſus, which extend from Derbent to the Black Sea. Theſe abound with combuſtible and mineral ſubſtances; and ſprings of NAPHTHA are common at the foot of them. It is therefore chiefly to the naphtha, that we muſt attribute the cauſe of the bitterneſs peculiar to its waters; for it is certain, that this bitumen flows from the mountains, ſometimes pure, and ſometimes mixed with other ſubſtances, acquired in its paſſage through ſubterranean channels, to the ſea, where it falls to the bottom by its ſpecific gravity. It is certain too, that the N. and NW. winds detach the greateſt quantities of this naphtha; whence it is evident, that the bitter taſte muſt be ſtrongeſt when theſe winds prevail; and weakeſt at the ſurface, or in the neighbourhood of the ſhore, the waters there being leſs impregnated with ſalt, and the naphtha which is united with the water by the ſalt, being then either carried to a diſtance by the winds, or precipitated to the bottom. But it is not a bitter taſte alone, that the naphtha communicates to the waters of the Caſpian: theſe waters were analyſed by M. Gmelin, and found to contain, beſides the common ſea ſalt, a conſiderable proportion of Glauber ſalt, intimately united with the former, and which is evidently a production of the naphtha. As the waters of the Caſpian have no outlet, they are diſcharged by ſubterranean canals through the earth, where they depoſit beds of ſalt; the ſurface of which correſponds with that of the level of the ſea. The two great deſarts, which extend from it to the E. and W. are chiefly compoſed of a ſaline earth, in which the ſalt is formed by effloreſcence into regular cryſtals; for which reaſon ſalt ſhowers and dews are exceedingly common in that neighbourhood. The ſalt of the marſhes at Aſtracan, and that found in effloreſcence in the deſarts, are by no means pure ſea ſalt, but much debaſed by Glauber ſalt. In many places, indeed, it is found with cryſtals of a lozenge ſhape, which are peculiar to it, without any cubical appearance, like thoſe of ſea ſalt. A great deal has been written on the ſucceſſive augmentation and decreaſe of the Caſpian Sea, but with little truth. There is indeed a certain riſe and fall of its waters, but in which, no obſervation has ever diſcovered any regularity. Many ſuppoſe, and it is not improbable, that the ſhores of the Caſpian were anciently much more extenſive than at preſent, and that it once communicated with the Black ſea. It is probable too, that the level of this laſt was formerly much higher. If then it be allowed, that the waters of the Black Sea, before it procured an exit by the Straits of Conſtantinople, roſe ſeveral fathoms above their preſent level, which, from many concurring circumſtances, may eaſily be admitted; it follows, that all the plains, of the Crimea, the Kuman, the Wolga, and the Jaik, and thoſe of Great Tartary beyond the lake of Arat, in ancient times formed but one ſea, which embraced the N. extremity of Caucaſus by a narrow ſtrait of little depth; the veſtiges of which are ſtill obvious in the river Mantyſch.

CASPII, an ancient people of Hircania, near the Caſpian Sea, who are ſaid to have trained up dogs for war.

(1.) CASQUE, in natural hiſtory, the helmet ſhell; a ſpecies of MUREX.

(2.) CASQUE. See CASK, § 2–4.

CASSADA. See CASSAVI, and JATROPHA.

* CASSAMUNAIR. *n. ſ.* An aromatick vegetable, being a ſpecies of *galangal*, brought from the Eaſt, a nervous and ſtomachick ſimple. *Quincy.*

(1.) CASSANA, John Auguſtine, an eminent painter, was born in 1664; and educated along with his brother Nicholas, (N° 2.) by their father John Francis Caſſana, a Genoeſe, who had been taught the art by Bernardine Stozzi. He finiſhed his ſtudies at Venice, where Nicolas reſided for ſome time. Although he deſigned hiſtorical ſubjects with expertneſs, and with a correctneſs of outline equal to his brother; yet from fraternal affection, he declined to interfere with him, and choſe to paint all ſort of animals and fruits. In that ſtyle he arrived at a high degree of excellence, imitating nature with exactneſs, beauty, and truth; expreſſing the various plumage of his birds, and the hairs of the different animals with ſuch tenderneſs and delicacy, as rendered them highly eſtimable. He alſo painted fruits of thoſe kinds which were the moſt uncommon, or of ſingular colours; and ſuch fiſhes as excited admiration by their unuſual forms. He ſometimes alſo painted the portraits of particular perſons, which he deſigned and coloured with the ſame merit that was viſible in all his other performances. At laſt he determined to viſit Genoa, where his family had lived in eſteem; and took with him ſeveral pictures which he had already finiſhed. His intention was to diſplay his generoſity, and to appear as a perſon of greater wealth and conſequence than he really was; and to ſupport that character, he gave preſents of his pictures to ſeveral of the principal nobility of that city. But unhappily, he experienced no grateful return for his prodigal munificence: he reduced himſelf by that vain liberality to the moſt neceſſitous circumſtances; was deprived of the means to procure even the neceſſaries of life; and waſted away the remainder of his days in poverty.

(2.) Cassana, Nicolas, or Nicoletto, an eminent Italian painter, brother to the preceding, (N° 1.) was born at Venice in 1659. He ſoon diſtinguiſhed himſelf by the beauty of his colouring, the gracefulneſs of his figures in hiſtorical compoſitions, as well as portrait; in which laſt he peculiarly excelled. People of the firſt rank were anxious to obtain their portraits. The Grand Duke of Tuſcany, who was an excellent judge and liberal patron of merit, invited Nicoletto to his court; where he painted the portraits of that prince, the princeſs his conſort, and many of the principal nobility of Florence. Among other hiſtorical ſubjects, he executed a very capital deſign, on the *Conſpiracy of Catiline*: it conſiſted of 9 figures as large as life, down to the knees. The two principal ones were repreſented as with one hand joined in the preſence of their companions, and in their other hand holding a cup of blood. Nicoletto was at laſt invited to England, and introduced to queen Anne, to paint her portrait; in which he ſucceeded ſo happily, that the queen diſtinguiſhed him by many marks of favour; but he did not enjoy his good fortune long, as he died in London, in 1713.

CASSANDER, king of Macedon after Alexander the Great, was the ſon of Antipater. He made ſeveral conqueſts in Greece, aboliſhed democracy at Athens, and gave the government of that ſtate to the orator, Demetrius Phalereus. Olympias, the mother of Alexander, having cauſed Aridæus and his wife Euridyce, with others of Caſſander's party, to be put to death; he beſieged Pydne, whither the queen had retired, took it by ſtratagem, and cauſed her to be put to death. He married Theſſalonice, the ſiſter of Alexander; and killed Roxana and Alexander, the wife and ſon of that conqueror. At length he entered into an alliance with Seleucus and Lyſimachus, againſt Antigonus and Demetrius; over whom he obtained a great victory near Ipſus in Phrygia. A. A. C. 301; and died 3 years after, in the 19th year of his reign.

(1.) CASSANDRA, in fabulous hiſtory, the daughter of Priam and Hecuba, was beloved of Apollo, who promiſed to beſtow on her the ſpirit of prophecy, provided ſhe would conſent to his love. Caſſandra ſeemed to accept the propoſal; but had no ſooner obtained that gift, than ſhe laughed at the tempter, and broke her word. Apollo, being enraged, revenged himſelf by cauſing no credit to be given to her predictions; hence ſhe in vain propheſied the ruin of Troy. Ajax, the ſon of Oileus, having raviſhed her in the temple of Minerva, he was ſtruck with thunder. She fell into the hands of Agamemnon, who loved her to diſtraction; but ſhe predicted to him in vain, that he would be aſſaſſinated, in his own country. He was killed, with her, by the intrigues of Clytemneſtra; but their death was avenged by Oreſtes.

(2.) Cassandra, in natural hiſtory, a very elegant ſea-ſhell of the Concha globosa kind, more uſually known by the name of the Lyra, or harp ſhell.

(1.) CASSANO, a town of Italy in Calabria citerior, in Naples, with a biſhop's ſee. Lon. 16. 30. E. Lat. 39. 55. N.

(2.) Cassano, a town of Italy, in the Milaneſe, late in the republican dep. of the Adda, rendered memorable by an obſtinate battle, fought between the Germans and French in 1705. It is ſeated on the river Adda. Lon. 10. 0. E. Lat. 45. 20. N.

CASSAON, in ichthyology, a ſmall fiſh of the ſhark kind, but leſs miſchievous, called Cucuri by the Braſilians.

* *To* CASSATE. *v. a.* [*caſſer*, Fr. *caſſare*, low Lat.] To vacate; to invalidate; to make void; to nullify.—This opinion ſuperſedes and *caſſates* the beſt medium we have. *Ray on the Creation.*

* CASSATION. *n. ſ.* [*caſſatio*, Lat.] A making null or void. *Dict.*

(1.) * CASSAVI. Cassada. *n. ſ.* A plant. It is cultivated in all the warm parts of America, where the root, after being diveſted of its milky juice, is ground to flour, and then made into cakes of bread. Of this there are two ſorts. The moſt common has purpliſh ſtalks, with the veins and leaves of a purpliſh colour; but the ſtalks of the other are green, and the leaves of a lighter green. The laſt ſort is not venomous, even when the roots are freſh and full of juice, which the negroes frequently dig up, roaſt, and eat, like potatoes, without any ill effects. *Miller.*

(2.) Cassavi. See Jatropha.

* CASSAWARE. See Cassiowary.

CASSAY, a kingdom of Aſia, bounded on the W. by Bengal, N. by Aſſam, E. and SE. by Birmah, and S. by Aracan. It is fertile and populous, and now ſubject to the Birmans. Munnypour is the capital.

(1.) CASSEL, a ci-devant chatellany of French Flanders, now included in the dep. of the North.

(2.) Cassel, a river in Caernarvonſhire.

(3.) Cassel, a town of France, in the ci-devant French Flanders, now included in the department of the North. It is ſeated on a mountain, where the terrace of the caſtle is ſtill to be ſeen; and from whence there is one of the fineſt proſpects in the world; for one may ſee no leſs than 32 towns, with a great extent of the ſea, though it is diſtant 50 miles. Lon. 2. 36. E. Lat. 50. 48. N.

(4.) Cassel, a town of Germany in the circle of the Lower Rhine, on the E. ſide of the river, oppoſite to the city of Mentz; with which it has a communication by a bridge of boats.

(5.) Cassel, the capital of the landgrave of Heſſe caſſel, in the late circle of the Upper Rhine in Germany. See Hesse-cassel. It is divided into the Old, New, and High towns. The New Town is beſt built, the houſes being of ſtone, and the ſtreets broad. The houſes of the Old Town, which is within the walls, are moſtly of timber; but the ſtreets are broad, and the market-places ſpacious. It is ſtrongly fortified, but the fortifications are not regular. It contains about 32,000 inhabitants, of whom a great proportion are French Proteſtants. Theſe have eſtabliſhed ſeveral manufactories in the place, particularly in the woollen branch. It is ſeated on the declivity of a hill, near the river Fulda, 40 miles S. of Paderborn. Lon. 9. 34. E. Lat. 51. 20. N.

CASSEN. See Caresen.

CASSENTON, a town in Oxfordſhire, ſeated on the Iſis, 4 miles from Oxford.

CASSERTA. See Caserta.

CASSEY, a town on the Hier, near Norwich.

(I.) * CASSIA. *n. ſ.* A ſweet ſpice mentioned by *Moſes*, *Ex.* xxx. 24. as an ingredient in the compoſition of the holy oil, which was to be made uſe of in the conſecration of the ſacred veſſels of the tabernacle. This aromatick is ſaid to be the bark of a tree very like cinnamon, and grows in the Indies without being cultivated. *Calmet.*—All thy garments ſmell of myrrh, aloes, and *caſſia*. *Pſalm* xlv. 8.

(II.) * Cassia. *n. ſ.* The name of a tree.—It hath a cylindrical, long, taper, or flat pod, divided into many cells by tranſverſe diaphragms; in each of which is contained one hard ſeed, lodged, for the moſt part, in a clammy black ſubſtance, which is purgative. The flowers have 5 leaves, diſpoſed orbicularly. *Miller.*

(III.) Cassia, in botany; A genus of the monogynia order, belonging to the decandria claſs of plants; and in the natural method ranking under the 33d order, *Lomentaceæ.* The calyx is pentaphyllous; petals 5; antheræ upper, three barren; lower, three beaked: a leguminous plant. There are 30 ſpecies all natives of warm climates. The moſt remarkable are,

1. Cassia fistula, the purging caſſia of Alexandria. It is a native of Egypt and both Indies, where it riſes to the height of 40 or 50 feet, with a large trunk, dividing into many branches, garniſhed with winged leaves, compoſed of 5 pair of ſpear-ſhaped lobes which are ſmooth, having many tranſverſe nerves from the mid rib to the borders. The flowers are produced in long ſpikes at the end of the branches, each ſtanding upon a pretty long foot-ſtalk; theſe are compoſed, like the former, of fine yellow concave petals, which are ſucceeded by cylindrical pods from one to two feet long, with a dark brown woody ſhell, having a longitudinal ſeam on one ſide, divided into many cells by tranſverſe partitions, each containing one or two oval, ſmooth, compreſſed ſeeds, lodged in a blackiſh pulp, which is uſed in medicine. There are two ſorts of this drug in the ſhops; one brought from the Eaſt Indies, the other from the Weſt: The canes or pods of the latter are generally large, rough, thick-rinded, and the pulp nauſeous; thoſe of the former are leſs, ſmoother, the pulp blacker, and of a ſweeter taſte; this ſort is preferred to the other. The pods ſhould be choſen weighty, new, not rattling (from the ſeeds being looſe within them) when ſhaken. The pulp ſhould be of a bright ſhining black colour, and a ſweet taſte, not harſh, which happens from the fruit being gathered before it has grown full ripe, or ſouriſh, which it is apt to turn upon keeping; It ſhould neither be very dry nor very moiſt: nor at all mouldy; which, from its being kept in damp cellars or moiſtened, in order to increaſe its weight, it is very ſubject to be. Greateſt part of the pulp diſſolves both in water and rectified ſpirit; and may be extracted from the cane by either. The ſhops employ water, boiling the bruiſed pod therein, and afterwards evaporting the ſolution to a due conſiſtence. This pulp is a gentle laxative medicine, and frequently given in a doſe of ſome drams in coſtive habits. Some preſcribe a doſe of 2 oz. or more as a cathartic, in inflammatory caſes, where the more acrid purgatives have no place; but in theſe large quantities it generally nauſeates the ſtomach, produces flatulencies, and ſometimes gripings of the bowels, eſpecially if the caſſia be not very good: theſe effects may be prevented by the addition of aromatics, and exhibiting it in a liquid form. Geoffroy ſays, it does ſervice in the tenſion of the belly, which ſometimes follows the imprudent uſe of antimonials: and that it may be advantageouſly acuated with the more acrid purgatives, or antimonial emetics, or employed to abate their force. Valliſmeri relates, that the purgative virtue of this medicine is remarkably promoted by manna: that a mixture of 4 drams of caſſia and 2 of manna, purges as much as 12 drams of caſſia or 32 of manna alone. Sennertus obſerves, that the urine is apt to be turned of a green colour by the uſe of caſſia: and ſometimes, where a large quantity has been taken blackiſh.

2. Cassia senna is a ſhrubby plant cultivated in Perſia, Syria, and Arabia, for the leaves, which form a conſiderable article of commerce. They are of an oblong figure, ſharp-pointed at the ends, about a quarter of an inch broad, and not a full inch in length, of a lively yellowiſh green colour, a faint not very agreeable ſmell, and a ſubacrid, bitteriſh, nauſeous taſte. They are brought from the above places, dried and picked from the ſtalks, to Alexandria in Egypt, and thence imported into Europe. Some inferior ſorts are brought from Tripoli and other places; theſe may eaſily be diſtinguiſhed by their being either narrower, longer, and ſharper pointed; or larger, broader, and round pointed, with ſmall prominent veins; or large and obtuſe, of a freſh green colour, without any yellow caſt. Senna is a very uſeful cathartic, operating mildly, and yet effectually: and if judiciouſly doſed and managed, rarely occaſioning the ill conſequences which too frequently follow the exhibition of the ſtronger purges. The only inconveniences complained of in this drug are, its being apt to gripe, and its nauſeous flavour. The griping quality depends upon a reſinous ſubſtance, which, like the other bodies of this claſs, is naturally diſpoſed to adhere to the coats of the inteſtines. The more this reſin is divided by ſuch matters as take off its tenacity, the leſs adheſive and conſequently the leſs irritating and griping it will prove: and the leſs it is divided, the more

made

griping; hence ſenna given by itſelf, or infuſions made in a very ſmall quantity of fluid, gripe ſeverely, and purge leſs than when diluted by a large portion of ſuitable menſtruum, or divided by mixing the infuſion with oily emulſions. The ill flavour of this drug is ſaid to be abated by the greater water figwort: but we cannot conceive that this plant, whoſe ſmell is manifeſtly fetid and its taſte nauſeous and bitter, can at all improve thoſe of ſenna: others recommend bohea tea, though neither has this any conſiderable effect. The ſmell of ſenna reſides in its more volatile parts, and may be diſcharged by lightly boiling infuſions of it made in water: the liquor thus freed from the peculiar flavour of the ſenna, may be eaſily rendered grateful to the taſte, by the addition of any proper aromatic tincture or diſtilled water. The colleges both of London and Edinburgh have given ſeveral formulæ for the exhibition of this article, ſuch as thoſe of infuſion, powder, tincture, and electuary. The doſe of ſenna in ſubſtance, is from a ſcruple to a dram: in infuſion, from one to 3 or 4 drams. It has been cuſtomary to reject the pedicles of the leaves of ſenna as of little or no uſe: Geoffroy however obſerves, that they are not much inferior in efficacy to the leaves themſelves. The pods or ſeed veſſels are by the college of Bruſſels preferred to the leaves: they are leſs apt to gripe, but proportionably leſs purgative.

(IV.) Cassia lignea. See Laurus.

(V.) Cassia, poet's. See Osyris.

CASSIAGO. See Plantago.

CASSIBELAN, or CASSIBELAUNUS, king of the Trinobantes, the ſon of Heli, ſucceeded his brother, king Lud, about A. A. C. 62. About 5 years after his acceſſion, Julius Cæſar having landed his army on the Britiſh Coaſt, Caſſibelan was choſen commander in chief of the Britiſh forces; but theſe undiſciplined and diſunited troops, though they made a brave oppoſition, fell an eaſy conqueſt to the veteran Romans: A. A. C. 55. Caſſibelan therefore made the beſt terms he could with Cæſar, and engaged to pay a tribute of about 3000 l. a year to the Romans, and to ſend hoſtages for the payment, Only two of the Britiſh ſtates however fulfilled their part of this treaty: whereupon Cæſar returned next year with a fleet of 800 ſhips; and though Caſſibelan oppoſed him with all the united force of South Btitain, he was repeatedly defeated; his capital burnt; and Mandubratius, Cæſar's all eſtabliſhed as king of the Trinobantes. Caſſibelan died A. A. C. 48.

(1.) CASSIDA, in botany. See Scutellaria.

(2.) Cassida, in zoology, a genus of inſects belonging to the order of coleoptera. The feelers are like threads, but thicker on the outſide; the elytra are marginated; and the head is hid under the thorax; from which laſt circumſtance is derived the name of the genus. Foreign countries afford many fine ſpecies of them. Thoſe of Britain have ſomething ſingular. Their larva, by the help of the two prongs which are to be found at its hinder extremity, makes itſelf, with its own excrements, a kind of umbrella that ſhelters it from the ſun and rain. When this umbrella grows too dry, it parts with it for a new one. This larva caſts its ſlough ſeveral times. Thiſtles and verticillated plants are inhabited by theſe inſects. There is one ſpecies, of which the chryſalis reſembles an armorial eſcutcheon. It is that which produces our variegated caſſida, and is a very ſingular one. Numbers of them are found on the ſide of ponds, upon the wild elecampane. See *Plate* L. *fig.* 3.

CASSIDARIUS, in Roman antiquity, an officer in the armories, who had the care of the helmets.

(1.) * CASSIDONY, or Stickadore. *n. ſ.* [*ſtoechas*, Lat] The name of a plant

(2.) Cassidony. See Gnaphalium.

CASSIGNY, a town of Italy, in Piedmont.

CASSII. See Caishow.

CASSIMER, or Casimer, a thin tweeled woollen cloth, much in faſhion for ſummer uſe.

CASSIMERE, or Cashmire. See Cashmire.

CASSINE, in botany; A genus of the trigynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 23d order, *Dumoſæ*. The calyx is quinquepartite; the petals are 5; and the fruit is a triſpermous berry. There are 3 ſpecies, all of them natives of warm climates. Of theſe the moſt remarkable is the

Cassine yapon, a native of the maritime parts of Virginia and Carolina It riſes to 10 or 15 feet, ſending out branches from the ground upward, garniſhed with ſpear-ſhaped leaves placed alternately, which continue green through the year. The flowers are produced in cloſe whorls round the branches, at the foot-ſtalks of the leaves; they are white, and divided into 5 parts, almoſt to the bottom. The berries are of a beautiful red colour, and as they continue moſt part of the winter upon the plants without being touched by the birds, we may conclude that they are poiſonous; as few of the wholeſome fruits eſcape their depredations. The Indians, however, have a great veneration for this plant, and at certain ſeaſons of the year come in great numbers for the leaves. On ſuch occaſions they make a fire upon the ground, and, putting on it a great kettle full of water, they throw in a large quantity of yapon leaves; and when the water has boiled ſufficiently, they drink large draughts of the decoction out of the kettle; which ſeldom fails to vomit them very ſeverely. In this manner, however, they continue drinking and vomiting for 3 days together, until they imagine themſelves ſufficiently cleanſed; they then gather every one a bundle of the ſhrub, and carry it home with them.—In the operation of theſe leaves by vomiting, thoſe who have taſted of them ſay, that there is no uneaſy ſenſation. The matter diſcharged comes away in a full ſtream by the mouth, without any violence, or ſo much as diſpoſing the patient to reach, or decline his head. The Spaniards who live near the gold mines of Peru, are frequently obliged to drink an infuſion of this herb in order to moiſten their breaſts; without which they are liable to a ſort of ſuffocation, from the ſtrong metallic exhalations that continually proceed from the mines. In Paraguay, the Jeſuits make a great revenue, by importing the leaves of this plant into many countries, under the name of *Paraguay* or *South Sea tea* which is there drank in the ſame manner as that of China or Japan is with us. It is with difficulty preſerved in England.

(1.) CASSINI, John Dominic, a moſt excellent aſtronomer, born at Piedmont in 1635. His early proficiency in aſtronomy procured him an invitation to be mathematical profeſſor at Bologna when he was only 15 years of age: and a comet appearing in 1652, he diſcovered that comets were not accidental meteors, but of the ſame nature, and probably governed by the ſame laws, as the planets In the ſame year, he ſolved a problem given up by Kepler and Bullialdus as inſolvable, which was to determine geometrically the apogee and eccentricity of a planet from its true and mean place In 1663, he was appointed inſpector general of the fortifications of Urbino, and had afterwards the care of all the rivers in the eccleſiaſtical ſtate: he ſtill however proſecuted his aſtronomical ſtudies, by diſcovering the revolution of Mars round his own axis; and, in 1666, publiſhed his theory of Jupiter's ſatellites. Caſſini was invited into France by Louis XIV. in 1669, where he ſettled as firſt profeſſor in the royal obſervatory. In 1677, he demonſtrated the line of Jupiter's diurnal rotation; and in 1684, diſcovered four more ſatellites belonging to Saturn, Huygens having found out one before. In 1695, he went to Italy to the meridian line, which he had ſettled in 1653, and in 1700 he continued the meridian line of France, which had been begun by Picard. He inhabited the royal obſervatory at Paris more than 40 years; and died in 1712, having loſt his ſight ſome years before.

(2.) Cassini, James, the ſon of the preceding, was born at Paris, in 1677. He was educated at the Mazarine college, under Varignon, profeſſor of mathematics; and when only 17 years of age was admitted a member of the academy. In 1696, he viſited England, and was there choſen a fellow of the royal ſociety. In 1712, he ſucceeded his father in the royal obſervatory at Paris, and added greatly to the ſtock of ſcience, by numerous diſcoveries. But having in 1720, publiſhed a book on the figure of the earth, maintaining, in oppoſition to Newton, that it was an oblong ſpheroid, the French king ſent two companies of mathematicians, on towards the polar circle, and the other to the equator, to meaſure a degree, and a decided refutation of Caſſini's opinion was the reſult. In 1723 he deſcribed a perpendicular to the meridian of France, from Paris to St Malo, and in 1724, from Paris to Straſburg. In 1740, he publiſhed Elements of Aſtronomy, with Aſtronomical Tables. He died in 1756.

(3.) Cassini de Thury, Cæſar François, ſon of the above, N° 2. was born at Paris in 1714. When ten years of age, he calculated the phaſes of the ſolar eclipſe of 1727. He ſucceeded his father, and employed himſelf for many years in perfecting a general chart of France, and in continuing the perpendicular of the meridian of Paris. He wrote a great number of papers, publiſhed in the Memoirs of the Academy of Sciences. He died in 1784, and was ſucceeded by his only ſon, count John Dominic Caſſini.

CASSINOGOROD, a town in Cassinow.

CASSINOW, a province of Ruſſia.

CASSIODORUS, Marcus Aurelius, ſecretary of ſtate to Theodoric king of the Goths, was born at Squillace, in Naples, about A. D. 481. He was alſo appointed governor of Sicily by the ſame prince; and in 514 was raiſed to the dignity of conſul, in which Theodoſius and Vitiges continued him, under whom his reputation was very great. Perceiving the fall of the Gothic kingdom, and tired of the troubles of a public ſtation, he reſolved to retire from the world; and accordingly went to his native place, Squillace, where, having built a hermitage and monaſtery, he devoted himſelf to his ſtudies and religion. Here alſo, he amuſed himſelf in making ſun-dials, water hourglaſſes, and perpetual lamps. He died about 577. He wrote a Chronology from the beginning of the world to the year 519; a Hiſtory of the Goths, of which an abridgment only remains; Letters written while ſecretary, yet extant and valuable; a Treatiſe on Orthography; and Comentaries on ſeveral paſſages of ſcripture; of the latter, thoſe moſt eſteemed are his *Divine Inſtitutions*, and his treatiſe *on the Soul*. The beſt edition of his works is that of Father Garret, printed at Rouen in 1679.

(1.) CASSIOPEIA, in aſtronomy, one of the conſtellations of the northern hemiſphere, ſituated next to Cepheus. In 1572, there appeared a new ſtar in this conſtellation, which at firſt ſurpaſſed in magnitude and brightneſs Jupiter himſelf; but it diminiſhed by degrees, and at laſt diſappeared, at the end of 18 months. It alarmed all the aſtronomers of that age, many of whom wrote diſſertions on it; among the reſt Tycho Brahe, Kepler, Maurolycus, Lycetus, Gramineus, &c. Beza, the landgrave of Heſſe, Roſa, &c. wrote to prove it a comet, and the ſame which appeared to the Magi at the birth of Jeſus Chriſt, and that it came to declare his ſecond coming: They were anſwered on this ſubject by Tycho Brahe. See Astronomy, § 548.

(2.) Cassiopeia, in fabulous hiſtory, wife to Cepheus king of Ethiopia, and mother of Andromeda. She thought herſelf more beautiful than the Nereides, who deſired Neptune to revenge the affront; ſo that he ſent a ſea-monſter into the country, which did much harm. To appeaſe the god, her daughter Andromeda was expoſed to the monſter, but was reſcued by Perſeus; who obtained of Jupiter, that Caſſiopeia might be placed after her death among the ſtars: hence the conſtellation of that name.

(1.) * CASSIOWARY. *n. ſ.* A large bird of prey in the Eaſt Indies.—I have a clear idea of the relation of dam and chick, between the two *caſſiowaries* in St James's Park. *Locke.*

(2.) Cassiowary. See Struthio, N° 2.

CASSIQUE, a chief governor in ſome parts of the Weſt Indies.

CASSIS, in antiquity, a plated or metalline helmet; different from the galea, which was of leather.

CASSITERIA, [from κασσιτερος, tin,] in the natural hiſtory of foſſils, a genus of cryſtals, the figures of which are influenced by an admixture of ſome particles of tin. The caſſiteria are of two kinds; the whitiſh pellucid caſſiterion, and the brown. The firſt is a tolerably bright and pellucid cryſtal, and ſeldom ſubject to the common blemiſhes of cryſtal: it is of a perfect and regular form, in the figure of a quadrilateral pyramid. The brown caſſiterion is like the former in figure; it is of a very ſmooth and gloſſy ſurface.

face. They are found chiefly in Devonſhire and Cornwall.

CASSITERIDES, in ancient geography, a cluſter of iſlands W. of the Land's End; oppoſite to Celtibetia. and famous for their tin. They were formerly open to none but Phœnicians; who carried on this commerce from Gades, concealing the navigation from the reſt of the world. They are ſuppoſed to be the SCILLY Iſlands.

(1.) CASSIUS LONGINUS, Caius, one of the conſpirators againſt Cæſar. He was married to Junia, the ſiſter of Marcus Brutus. After his defeat at Philippi, he ordered one of his freed men to put him to death with his own ſword, A. A. C. 41. See ROME.

(2.) CASSIUS LONGINUS, Lucius, a celebrated Roman lawyer, who flouriſhed 113 years before Chriſt. He was ſo inflexible a judge, that his tribunal was called the *Rock of the impeached*. From him very ſevere judges have been called CASSIANI.

(3.) CASSIUS VISCELLINUS, Spurius, a renowned Roman general, whoſe enemies accuſing him of aſpiring to royalty, he was thrown down from the Tarpeian rock, A. A. C. 485; after having thrice enjoyed the conſular dignity, been once general of the horſe under the firſt dictator that was created at Rome, and twice received the honour of a triumph.

* CASSOCK. *n. ſ.* [*caſaque*, Fr.] A cloſe garment: now generally that which clergymen wear over their gowns.—Half dare not ſhake the ſnow from off their *caſſocks*, leſt they ſhake themſelves to pieces. *Shakeſpeare.*—His ſcanty ſalary compelled him to run deep in debt for a new gown and *caſſock*, and now and then forced him to write ſome paper of wit or humour, or preach a ſermon for 10s. to ſupply his neceſſities. *Swift.*

CASSONADE. in commerce, caſk ſugar, or ſugar put into caſks after the firſt purification, but which has not been refined. It is ſold either in powder or in lumps; the whiteſt, and that of which the lumps are largeſt, is the beſt. Many imagine it ſweetens more than loaf ſugar; but it is certain that it yields a great deal more ſcum.

CASSOPO, an iſland in the Ionian Sea, anciently called Caſſiope, belonging to Venice.

CASSOVIA, a ſtrong town of Upper Hungary, capital of the county of Abanwyewar.

CASSOWARY. See STRUTHIO, N° 2.

CASSUBIA, a territory of Germany, in Pomerania, on the Caſpian Sea.

CASSULA, a caſſock.

CASSULBERRY, a village in Hertfordſhire, 3 miles NE. of Ware.

CASSUMAR, in the materia medica, a root approaching to that of zedoary. It is cardiac and ſudoritic, and famous in nervous caſes; it is alſo an ingredient in many compoſitions, and is preſcribed in powders, boluſes and infuſions. Its doſe is from 5 to 15 grains.

CASSUMBAZAR, a town of India, ſituated on the Ganges, in Bengal; 180 miles N. of Huegly. Lon. 80. 15. E. Lat. 24. 10. N.

(1.) * CASSWEED. *n. ſ.* A common weed, otherwiſe called *ſhepherd's Purſe*.

(2.) CASSWEED, in botany. See THLASPI.

CASSYTA, in botany, a genus of the monogynia order, belonging to the enneandria claſs of plants. The corolla is in the form of a calyx, divided into ſix ſegments; the nectarium is compoſed of three truncated glands encompaſſing the germen; the interior filaments are glandular; and the drupe contains a ſingle ſeed. There is but one ſpecies.

(1.) * CAST. *n. ſ.* [from the verb.] 1. The act of caſting or throwing; a throw.—

So when a ſort of luſty ſhepherds throw
The bar by turns, and none the reſt outgo
So far, but that the reſt are meaſuring *caſts*,
Their emulation and their paſtime laſts. *Waller.*

2. The thing thrown.—

Yet all theſe dreadful deeds, this deadly fray,
A *caſt* of dreadful duſt will ſoon allay. *Dryd.*

3. State of any thing caſt or thrown.—Plato compares life to a game at tables; there what *caſt* we ſhall have is not in our power, but to manage it well, that is. *Norris.* 4. Manner of throwing.—Some harrow their ground over, and ſow wheat or rye on it with a broad *caſt*; ſome only with a ſingle *caſt*, and ſome with a double. 5. The ſpace through which any thing is thrown.—And he was withdrawn from them about a ſtone's *caſt*, and kneeled down and prayed *Luke.* 6. A ſtroke; a touch.—We have them all with one voice for giving him a *caſt* of their court prophecy. *South.*—Another *caſt* of their politicks, was that of endeavouring to impeach an innocent lady, for her faithful and diligent ſervice of the queen. *Swift.* 7. Motion of the eye; direction of the eye.—Pity cauſeth ſometimes tears, and a flexion or *caſt* of the eye aſide; for pity is but grief in another's behalf; the *caſt* of the eye is a geſture of averſion, or lothneſs, to behold the object of pity. *Bacon's Natural Hiſtory.*—A man ſhall be ſure to have a *caſt* of their eye to warn him, before they give him a *caſt* of their nature to betray him. *South.* 8. He that ſquints is ſaid popularly to have a *caſt* with his eye. 9. The throw of dice.—

Were it good,
To ſet the exact wealth of all our ſtates
All at one *caſt*; to ſet ſo rich a main
On the nice hazard of ſome doubtful hour?
Shak.

10. Venture from throwing dice; chance from the fall of dice.—In the laſt war, has it not ſometimes been an even *caſt*, whether the army ſhould march this way or that way? *South.* 11. A mould; a form.—The whole would have been an heroick poem, but in another *caſt* and figure, than any that ever had been written. *Prior.* 12. A ſhade; or tendency to any colour.—The qualities of blood in a healthy ſtate are to be florid, the red part congealing, and the ſerum ought to be without any greeniſh *caſt*. *Arbuthnot.* 13. Exterior appearance.—

The native hue of reſolution
Is ſicklied o'er with the pale *caſt* of thought.
Shak.

14. Manner; air; mien.—Pretty conceptions, fine metaphors, glittering expreſſions, and ſomething of a neat *caſt* of verſe, are properly the dreſs, gems, or looſe ornaments of poetry. *Pope.*—Neglect not the little figures and turns on the words, nor ſometimes the very *caſt* of the periods, neither omit or confound any rites or cuſtoms of antiquity. *Pope on Homer.* 15. A flight; a number of

hawks diſmiſſed from the liſt.—A *caſt* of merlins there was beſides, which, flying off a gallant height, would beat the birds that roſe, down unto the buſhes, as falcons will do wild fowl over a river. *Sidney.* 16. [*Caſta*, Spaniſh.] A breed; a race; a ſpecies.

(2.) Cast is alſo uſed to denote a figure or ſmall ſtatue of bronze. See Bronze.

(3.) Cast, among founders, is applied to tubes of wax fitted in divers parts of a mould of the ſame matter; by means of which, when the wax of the mould is removed, the melted metal is conveyed into all the parts which the wax before poſſeſſed. It alſo denotes a cylindrical piece of braſs or copper, ſlit in two, lengthwiſe, uſed by the founders in ſand, to form a canal or conduit in their moulds, whereby the metal may be conveyed to the different pieces intended to be caſt.

(4.) Cast, among plumbers, a little brazen funnel at one end of a mould, for caſting pipes without ſoldering, by means of which the melted metal is poured into the mould.

(5.) Cast, in geography, a village in Somerſetſhire, S. of Frome Selwood.

(6.) Cast, or Caste, in the eaſtern affairs, is uſed in a ſenſe ſomewhat ſimilar to Dr Johnſon's laſt definition, (§ 1. *def.* 16.) for a tribe, or number of families, of the ſame rank and profeſſion. The diviſion of a nation into caſts chiefly obtains in the dominions of the Great Mogul, kingdom of Bengal, iſland of Ceylon, and the great peninſula oppoſite thereto. In each of theſe there are, according to father Martin, 4 principal caſts, viz. 1. Bramins, who are reckoned the moſt noble: 2. Rajas, or princes, who pretend to be deſcended from divers royal families: 3. Choutres, which caſt comprehends all artificers; and, 4. Parias, the loweſt of all. Henry Lord, however, divides the Indians about Surat into 4 *caſts*, ſomewhat differently; viz. into Bramins, or prieſts: Cuttery, or ſoldiers; Shuddery, banians, or merchants; and Wyse, mechanics, or artificers. Every trade is confined to its proper caſt, nor is it allowed to be exerciſed by any but thoſe whoſe fathers profeſſed the ſame; ſo that a tailor's ſon can never be a painter, let his genius be ever ſo great, nor a painter's ſon a tailor. There are ſome employments, however, open to all the caſts; *e.g.* every body may be a ſoldier, or a merchant. Some of the different caſts are allowed to till the ground, but not all. The caſt of parias is held infamous, inſomuch that it is a diſgrace to have any dealings or converſation with them; and there are ſome trades in the caſt of choutres, which debaſe their profeſſors almoſt to the ſame rank. Thus ſhoemakers, and all artificers in leather, fiſhermen, and even ſhepherds, are reputed no better than *parias;* though they are doubtleſs much more uſeful members of ſociety than their ſuperſtitious bramins and proud rajahs.

(1.) * *To* Cast. *v. a.* preter. *caſt*; particip. paſſ. *caſt.* [*kaſter*, Daniſh.] This is a word of multifarious and indefinite uſe. 1. To throw with the hand.—I rather chuſe to endure the wounds of thoſe darts, which envy *caſteth* at novelty, than to go on ſafely and ſleepily in the eaſy ways of ancient miſtakings. *Raleigh.* 2. To throw away, as uſeleſs or noxious.—If thy right hand offend thee cut it off, and *caſt* it from thee. *Matthew.* 3. To throw, as from an engine—Sling to *caſt* ſtones. *Chron.* 4. To ſcatter by the hand: as, to *caſt* ſeed.—*Caſt* the duſt into the brook. *Deut.* 5. To force by violence.—*Caſt* them into the red ſea. *Exodus.*—*Caſt* them into another land. *Deut.* 6. To ſhed.—Nor ſhall your vine *caſt* her fruit. *Malachi.* 7. To throw from a high place.—

> Bear him to the rock Tarpeian, and from thence
> Into deſtruction *caſt* him. *Shak. Coriolanus.*

8. To throw as a net or ſnare.—I ſpeak for your own profit, not that I may *caſt* a ſnare upon you. 1 *Cor.* vii. 35. 9. To drop; to let fall.—They let down the boat into the ſea, as though they would have *caſt* anchor. *Acts*, xxvii. 30. 10. To throw dice, or lots.—And Joſhua *caſt* lots for them in Shiloh. *Joſh.* xviii. 10. 11. To throw, in wreſtling.—And I think, being too ſtrong for him, though he took my legs ſometimes, yet I made a ſhift to *caſt* him. *Shakeſpeare.* 12. To throw, as worthleſs or hateful.—His carcaſe was *caſt* in the way. *Chron.*—His friends contend to embalm his body, his enemies, that they may *caſt* it to the dogs. *Pope.* 13. To drive by violence of the weather.—Howbeit we muſt be *caſt* upon a certain iſland. *Acts.* 14. To emit.—This fumes off in the calcination of the ſtone, and *caſts* a ſulphureous ſmell. *Woodward.* 15. To bring ſuddenly or unexpectedly.—Content themſelves with that which was the irremediable error of former time, or the neceſſity of the preſent hath *caſt* upon them *Hooker.* 16. To build by throwing up earth; to raiſe.—Thine enemies ſhall *caſt* a trench about thee. *Luke.*—Earth-worms will come forth, and moles will *caſt* up more, and fleas bite more, againſt rain. *Bacon's Natural Hiſtory.* 17. To put into or out of any certain ſtate, with the notion of deſcent, or depreſſion: as, the king was *caſt* from his throne.—Jeſus had heard that John was *caſt* into priſon. *Matt.*—At thy rebuke both the chariot and horſe are *caſt* into a deep ſleep. *Pſalm* lxxvi. 6. 18. To condemn in a criminal trial.—We take up with the utmoſt incompetent witneſſes, nay, often ſuborn our own ſurmiſes and jealouſies, that we may be ſure to *caſt* the unhappy criminal. *Government of the Tongue.* 19. To overcome or defeat in a law ſuit. [from *caſter*, Fr.]—Were the caſe referred to any competent judge, they would inevitably be *caſt.* *Decay of Piety.* 20. To defeat.—

> No martial project to ſurpriſe,
> Can ever be attempted twice;
> Nor *caſt* deſign ſerve afterwards,
> As gameſters fear their loſing cards. *Hudibras.*

21. To caſhier.—You are but now *caſt* in his mood, a puniſhment more in policy than in malice; even ſo as one would beat his offenceleſs dog, to affright an imperious lion. *Shakeſpeare.* 22. To leave behind in a race.—

> In ſhort, ſo ſwift your judgments turn and wind,
> You *caſt* your fleeteſt wits a mile behind. *Dryd.*

23. To ſhed; to let fall; to lay aſide; to moult; to change for new.—Of plants ſome are green all winter, others *caſt* their leaves. *Bacon.*—The *caſting* of the ſkin is, by the ancients, compared to the breaking of the ſecundine, or cawl, but not rightly; for that were to make every *caſting* of the

ſkin a new birth: and beſides, the ſecundine is but a general cover, not ſhaped according to the parts. The creatures that *caſt* the ſkin, are the ſnake, the viper, the graſhopper, the lizard, the ſilkworm, &c. *Bacon.* 24. To lay aſide, as fit to be uſed or worn no longer.—He has ever been of opinion, that giving *caſt* clothes to be worn by valets, has a very ill effect upon little minds. *Addiſon.* 25. To have abortions: to bring forth before the time.—Thy ewes and thy ſhe-goats have not *caſt* their young. *Gen.* 26. To make a preponderate; to decide by overbalancing; to give over weight.—How much intereſt *caſts* the balance in caſes dubious. *South.* 27. To compute; to reckon; to calculate.—The beſt way to repreſent to life the manifold uſe of friendſhip, is to *caſt* and ſee how many things there are, which a man cannot do himſelf. *Bacon's Eſſays.*—I have lately been *caſting* in my thoughts the ſeveral unhappineſſes of life, and comparing the infelicities of old age to thoſe of infancy. *Addiſon.* 28. To contrive; to plan out.—The cloiſter facing the South is covered with vines, and would have been proper for an orange-houſe; and had, I doubt not, been *caſt* for that purpoſe, if this piece of gardening had been then in as much vogue as it is now. *Temple.* 29. To judge; to conſider in order to judgment.—

If thou couldſt, doctor, *caſt*
The water of my land, find her diſeaſe,
And purge it to a ſound and priſtine health,
I would applaud thee. *Shakeſpeare.*

30. To fix the parts in a play.—Our parts in the other world will be new *caſt*, and mankind will be there ranged in different ſtations of ſuperiority. *Addiſon.* 31. To glance; to direct: applied to the eye or mind.—He then led me to the rock, and placing me on the top of it, *Caſt* thy eyes eaſtward, ſaid he, and tell me what thou ſeeſt. *Addiſon.* 32. To found; to form by running in a mould.—When any ſuch curious work of ſilver is to be *caſt*, as requires that the impreſſion of hairs, or very ſlender lines, be taken off by the metal, it is not enough that the ſilver be barely melted, but it muſt be kept a conſiderable while in a ſtrong fuſion. *Boyle.* 33. To melt metal into figures.—This was but a refiners fire, to purge out the droſs, and then *caſt* the maſs again in a new mould. *Burnet's Theory.* 34. To model; to conform by rule.—We may take a quarter of a mile for the common meaſure of the depth of the ſea, if it were *caſt* into a channel of an equal depth every where. *Burnet's Theory of the Earth.*—Under this influence, derived from mathematical ſtudies, ſome have been tempted to *caſt* all their logical, their metaphyſical, and their theological and moral learning into this method. *Watts's Logick.* 35. To communicate by reflection or emanation.—We may happen to find a fairer light *caſt* over the ſame ſcriptures, and ſee reaſon to alter our ſentiments even in ſome points of moment. *Watts on the Mind.* 36. To yield, to give up, without reſerve or condition.—The reaſon of mankind cannot ſuggeſt any ſolid ground of ſatisfaction, but in making God our friend, and in carrying a conſcience ſo clear, as may encourage us, with confidence, to *caſt* ourſelves upon him. *South.* 37. To inflict.—The world is apt to *caſt* great blame on thoſe who have an indifferency for opinions, eſpecially in religion. *Locke.* 38. *To caſt aſide.* To diſmiſs as uſeleſs or inconvenient.—

I have bought
Golden opinion from all ſorts of people,
Which would be worn now in their neweſt gloſs
Not *caſt aſide* ſo ſoon. *Shakeſpeare.*

39. *To caſt away.* To ſhipwreck.—Sir Francis Drake, and John Thomas, meeting with a ſtorm, it thruſt John Thomas upon the iſlands to the South, where he was *caſt away.* *Raleigh's Eſſays.* 41. *To caſt away.* To ruin.—It is no impoſſible thing for ſtates, by an overſight in ſome one act or treaty between them and their potent oppoſites, utterly to *caſt away* themſelves for ever. *Hooker.* 42. *To caſt by.* To reject or diſmiſs, with neglect or hate.—When men, preſuming themſelves to be the only maſters of right reaſon, *caſt by* the votes and opinions of the reſt of mankind as not worthy of reckoning. *Locke.* 43. *To caſt down.* To deject; to depreſs the mind.—The beſt way will be to let him ſee you are much *caſt down*, and afflicted for the ill opinion he entertains of you. *Addiſon.* 44. *To caſt forth.* To emit.—He ſhall grow as the lily, and *caſt forth* his roots as Lebanon. *Hoſea.* 45. *To caſt forth.* To eject.—I *caſt forth* all the houſhold ſtuff. *Nahum.* 46. *To caſt off.*—*Caſt* me not *off* in the time of old age. *Pſalms.* 47. *To caſt off.* To reject.—It is not to be imagined, that a whole ſociety of men ſhould publickly and profeſſedly diſown, and *caſt off* a rule, which they could not but be infallibly certain was a law. *Locke.* 48. *To caſt off.* To diſburden one's ſelf of.—All conſpired in one to *caſt off* their ſubjection to the crown of England. *Spenſer.*—The true reaſon why any man is an atheiſt, is becauſe he is a wicked man: religion would curb him in his luſts; and therefore he *caſts* it *off*, and puts all the ſcorn upon it he can. *Tillotſon.* 49. *To caſt off.* To leave behind.—Away he ſcours croſs the fields, *caſts off* the dogs, and gains a wood; but, preſſing through a thicket, the buſhes held him by the horns, till the hounds came in, and plucked him down. *L'Eſtrange.* 50. *To caſt off.* [hunting term.] To let go, or ſet free: as, to *caſt off* the dogs. 51. *To caſt out.* To reject; to turn out of doors.—Thy brat hath been *caſt out* like to itſelf, no father owning it. *Shak.* 52. *To caſt out.* To vent; to ſpeak; with ſome intimation of negligence or vehemence.—

Why doſt thou *caſt out* ſuch ungenerous terms
Againſt the lord and ſovereigns of the world?
Addiſon.

53. *To caſt up.* To compute; to calculate.—Some writers, in *caſting up* the goods moſt deſirable in life, have given them this rank, health, beauty, and riches. *Temple.* 54. *To caſt up.* To vomit.—Their villainy goes againſt my weak ſtomach, and therefore I muſt *caſt* it *up.* *Shak.* 55. *To caſt upon.* To refer to; to reſign to.—If things were *caſt upon* this iſſue, that God ſhould never prevent ſin, till man deſerved it, the beſt would ſin and ſin for ever.

(2.) * *To* Cast. *v. n.* 1. To contrive; to turn the thoughts.—All events called caſual, among inanimate bodies, are mechanically produced according to the determinate figures, textures, and motions of thoſe bodies, which are not conſcious of their own operations, nor contrive and *caſt* about how to bring ſuch events to paſs. *Bentley.*—

This way and that I *caſt* to ſave my friends,
Till one reſolve my varying counſel ends. *Pope.*

2. To admit of a form, by caſting or melting.—It comes at the firſt fuſion into a maſs that is immediately malleable, and will not run thin, ſo as to *caſt* and mould, unleſs mixed with poorer ore or cinders. *Woodward on Foſſils.* 3. To warp; to grow out of form.—Stuff is ſaid to *caſt* or warp, when, by its own drought, or moiſture of the air, or other accident, it alters its flatneſs and ſtraightneſs. *Moxon's Mechanical Exerciſes.* 4. *To caſt about.* To contrive; to look for means.—Inanimate bodies are not conſcious of their own operations, nor contrive and *caſt about* to bring ſuch events to paſs. *Bentley.*

CASTAGNA, a village of Iſtria, near Quieto.

CASTAGNARO, a river of Italy, which runs along the W. and S. of the Poleſin of Rovigo, and was one of the boundaries of the late Italian republic.

CASTAGNETTES. See CASTANET, § 2.

(1.) CASTAGNO, a village in Tuſcany.

(2.) CASTAGNO, Andrew DAL, hiſtorical painter, was born at Caſtagno, (N° 1.) in 1409; and being deprived of his parents, was employed by his uncle to attend cattle; but, having accidentally ſeen an ordinary painter at work in the country, he obſerved him for ſome time with ſurpriſe and attention, and afterwards made ſuch efforts to imitate him, as aſtoniſhed all who ſaw his productions. The extraordinary genius of Andrew became at laſt a common topic of diſcourſe in Florence; and excited the curioſity of Bernadetto de Medici, ſo far, that he ſent for Andrew; and perceiving that he had promiſing talents, he placed him under the care of the beſt maſters then in Florence. Andrew became particularly eminent in deſign, and in a few years made ſo great a progreſs, that he found as much employment as he could poſſibly execute. He painted only in diſtemper and freſco, with a manner of colouring that was not very agreeable, being rather dry and hard; till he learned the ſecret of painting in oil from Dominic Venetiano, who had derived his knowledge of that new diſcovery from Antonello da Meſſina. Andrew was the firſt of the Florentine artiſts, who painted in oil; but although he was in the higheſt degree indebted to Venetiano for the ſecret, yet he envied his merit ſo much, that, becauſe his own works ſeemed to be leſs admired than thoſe of Venetiano, he formed the horrid reſolution of aſſaſſinating his friend and benefactor. He executed this deſign with the utmoſt ingratitude and treachery, (for Venetiano at that time lived with him, and painted in partnerſhip with him), and he ſtabbed him at the corner of a ſtreet ſo ſecretly, that he eſcaped unobſerved, and unſuſpected to his own houſe, where he compoſedly ſat down to his work; and thither Dominic was ſoon after conveyed, to die in the arms of his murderer. No diſcovery of ſo inhuman a tranſaction was made till Andrew, through remorſe of conſcience, diſcloſed it on his death bed, in 1480. He finiſhed ſeveral conſiderable works at Florence, by which he gained great reputation; but when his crime became public, his memory was held in deſerved deteſtation. The moſt noted work of this maſter is in the hall of juſtice at Florence, repreſenting the execution of the conſpirators againſt the houſe of Medici.

CASTAGNOLA, a town of Piedment, on the river Po, 8 miles S. of Turin.

CASTALIA, or the CASTALIAN SPRING. See CASTALIUS FONS.

CASTALIDES, an epithet of the Muſes.

CASTALIO, Sebaſtian, was born at Chetillon, on the Rhone, in the year 1515. Calvin conceived ſuch an eſteem for him, during his ſtay at Straſburgh in 1540 and 1541, that he procured him a regent's place in the college of Geneva. Caſtalio, after continuing in this office near three years, was forced to quit it in 1544, on account of his particular opinions concerning Solomon's ſong, and Chriſt's deſcent into hell. He retired to Baſil, where he was made Greek profeſſor, and died in 1564, aged 48. He differed with Calvin and Beza, concerning predeſtination and the puniſhment of heretics. His works are very conſiderable, both on account of their quality and number. In 1545, he printed at Baſil, *Dialogorum Sacrorum Libri* IV; a work containing the principal hiſtories of the Bible thrown into the form of dialogues, in elegant Latin; to enable youth to make a proficiency in piety and in the Latin tongue at the ſame time. But his principal work is a Latin and French tranſlation of the ſcriptures. He began the Latin tranſlation at Geneva in 1542, and finiſhed it at Baſil, in 1550. It was printed at Baſil in 1551, and dedicated to Edward VI. king of England. The French verſion was dedicated to Henry II. of France, and printed at Baſil in 1555. A fault generally condemned in his Latin tranſlation is his uſing only claſſical terms.

CASTALIUS FONS, *Caſtalia*, a fountain at the foot of mount Parnaſſus, in Phocis, near the temple of Apollo, or near Delphi; ſacred to the Muſes. Its murmurs were thought prophetic.

CASTAMENA, or KASTAMONI, a town of Natolia, formerly a large city, but now much reduced in ſize and magnificence. It is 240 miles E. of Conſtantinople. Lon. 34. 22. E. Lat. 44. 42. N.

CASTANEA, in botany. See FAGUS.

(1.) * CASTANET. *n. ſ.* [*caſtaneta*, Sp.] A ſmall ſhell of ivory, or hard wood, which dancers rattle in their hands.—If there had been words enow between them, to have expreſſed provocation, they had gone together by the ears like a pair of *caſtanets*. *Congreve.*

(2.) CASTANETS, or CASTANETTAS, or CASTAGNETTES, are a kind of muſical inſtrument, wherewith the Moors, Spaniards, and Bohemians, accompany their dances, ſarabands, and guittars. It conſiſts of two little round pieces of wood dried, and hollowed in manner of a ſpoon, the concavities whereof are placed one on another, faſtened to the thumb, and beat from time to time with the middle finger, to direct their motion and cadences. The *caſtanets* may be beat 8 or 9 times in the ſpace of one meaſure, or ſecond of a minute.

CASTANOVITZ. See KASTANITZ.

(1.) * CASTAWAY. *adj.* [from the ſubſt.] Uſeleſs; of no value.—We only prize, pamper, and exalt this vaſſal and ſlave of death, or only remember, at our *caſtaway* leiſure, the impriſoned immortal ſoul. *Raleigh's Hiſtory.*

(2.) * Castaway. *n. ſ.* [from *caſt* and *away.*] A perſon loſt, or abandoned, by Providence; any thing thrown away.—Neither given any leave to ſearch in particular who are the heirs of the kingdom of God, who *caſtaways. Hooker.*

* CASTED. The *participle preterite* of *caſt*, but improperly, and found perhaps only in the following paſſage.—

When the mind is quicken'd, out of doubt,
The organs, though defunct and dead before,
Break up their drowſy grave, and newly move
With *caſted* ſlough and freſh legerity. *Shakeſ.*

CASTEL, Lewis Bertrand, a learned Jeſuit, born at Montpellier in 1688. He diſtinguiſhed himſelf by writing on gravity, mathematics, and *the muſic of colours*, a very whimſical idea, which he took great pains to reduce to practice. His piece on gravity, entitled *Traité de la Penſuteur univerſelle*, was printed at Paris in 1724. He afterwards publiſhed his *Mathematique Univerſelle*; which occaſioned his being unanimouſly choſen F. R. S. of London, without ſolicitation. He was alſo a member of the academies of Bourdeaux and Rouen: but his *Clavecin oculaire* made the moſt noiſe; and he ſpent much time and expence in making an *harpſichord for the eye*, but without ſucceſs. He alſo wrote for and againſt Sir Iſaac Newton, and publiſhed ſeveral other works; the principal of which are, *Le Plan du Mathematique abregee*, and a treatiſe entitled *Optique des Colours.* He led a very exemplary life, and died in 1757.

CASTELAMARA, a town of Naples, with a good harbour, in Principato Citeriore. It ſtands on the ſite of the ancient Stabia, at the foot of a woody mountain, on the bay of Naples. Lon. 14. 25. E. Lat. 41. 40. N.

CASTEL-A-MARE, a ſea port of Sicily in Val de Mazara, 30 miles WSW. of Palermo. Lon. 12. 50. E. Lat. 38. 7. N.

CASTEL-Aragoneſe, a ſtrong town on the NW. coaſt of Sardinia, with a good harbour. It was the firſt place taken in this iſland, at the end of the 13th century, by the Arragoneſe, whence its name; but ſince 1765, it has been called Caſtel Sardo, by the command of the king. It ſtands 20 miles NE. of Saſſari. Lon. 8. 57. E. Lat. 40. 55. N.

Castel-baldo. See Baldo.

Castel bar. See Castle-bar.

Castel-branco. See Castello-branco.

(1.) Castel del ovo, a ſmall iſland in the Tuſcan Sea, in the gulph of Naples, near the town, N° 2. It has a fortreſs with a good garriſon.

(2.) Castel del ovo, a town of Naples, connected with the iſland, (N° 1.) by a ſtone bridge.

Castel de vide. See Castello de vide.

Castel-folit, a town of Spain, in Catalonia, ſeated on an inacceſſible eminence, between Gironne and Campredon, about 15 miles from each, and near the river Fulva.

Castel-franco, a ſmall, fortified frontier town of Italy, in the Bologneſe, included in the late republican dep. of Upper Padua.

Castel-Franco, a pretorſhip of the late maritime diviſion of Auſtria, in Treviſano, containing one town, an old caſtle built in 1191, two pariſhes, ſeveral villages, and 7000 ſouls, chiefly employed in agriculture. This country appears like a grove, perpetually in bloſſom.

Castel-Gondolfo, a town of Italy, 10 m. S. by E. of Rome. Lon. 12. 46. E. Lat. 41. 44. N.

Castel-geloux, } a town of France, in the
Castel-jaloux, } department of Lot and Garonne, and ci-devant province of Gaſcony, ſeated on the Avance. Lon. 0. 25. E. Lat. 44 20. N.

CASTELL, Edmund, D. D. a learned Engliſh divine of the 17th century, diſtinguiſhed by his ſkill in the eaſtern languages. He was educated at Cambridge; where he was maſter of Catharine hall, Arabic profeſſor, and canon of Canterbury. He was alſo chaplain to Charles II. He had the greateſt ſhare in the Polyglott bible of London; and wrote the *Heptaglotton pro ſeptem Orientalibus, &c.* On this excellent work, which occupied a great part of his life, he beſtowed incredible pains and expence, even to the breaking of his conſtitution, and exhauſting of his fortune; having expended no leſs than 12,000 l. upon it. At length when it was printed, the copies remained unſold upon his hands. He died in 1685, and bequeathed all his oriental MSS. to the univerſity of Cambridge, on condition that his name ſhould be written on every copy in the collection.

CASTELLA, a town of Italy, about 5 miles NE. of Mantua, where an obſtinate battle was fought between the French and Auſtrians, on the 12th Sept. 1796, when the latter had the advantage, and took 300 French priſoners. Lon. 11. 15. E. Lat. 45. 30. N.

Castella del oro. See Terra Firma.

* CASTELLAIN. *n. ſ.* [*caſtellano*, Spain.] The captain, governour, or conſtable of a caſtle.

CASTELLAN, a dignity in Poland. The caſtellans are ſenators of the lower claſs, who in diets, ſit on low ſeats, behind the palatines, or great ſenators. They are a kind of lieutenants of provinces, and command a part of the palatinate under the palatine.

CASTELLANE, a pleaſant town of France, in the department of the Lower Alps, and ci-devant province of Provence, ſeated on the Verdon, in a mountainous but fertile country; 27 miles S. by E. of Senez.

CASTELLANETTA, a town in Naples, in Terra d' Otranta; 19 miles WNW. of Taranto.

(1.) * CASTELLANY. *n. ſ.* [from *caſtle.*] The lordſhip belonging to a caſtle; the extent of its land and juriſdiction. *Philips.*

(2.) Castellany, the territory belonging to any city or town *Chatelenie* was chiefly uſed in France and Flanders before the revolution.

CASTELLARIUS, the keeper, or curator, of a caſtellum.

* CASTELLATED. *adj.* [from *caſtle.*] Incloſed within a building, as fountain or ciſtern *caſtellated. Dict.*

CASTELLATIO, } in middle age writers,
CASTELLATION, } the act of building a caſtle, or of fortifying a houſe, and making it a caſtle. By the ancient Engliſh laws, caſtellation was prohibited without the king's eſpecial licence.

CASTELLAZO, a town of Piedmont, 2 miles E. of Alexandria, memorable for a battle between the French and Auſtrians, in 1704. Lon. 8. 50. E. Lat. 45. 3. N.

CASTEL-LEON, a town of Italy, in the ci-devant Cremoneſe, and late republican dep. of the Upper Po, ſituated S. of Crema, containing 5000 citizens.

(1.) CASTELLETTO, a town of Italy, in the late republican dep. of Montagne, ſituated on a lake formed by the Lambro.

(2.) Castelletto, a town of Italy, in the late republican dep. of the Upper Po, ſituated on the Canal of Oglio.

(1.) CASTELLI, Bernard, an eminent painter, born at Genoa, in 1557. He excelled in colouring and in portraits. He was the intimate friend of Taſſo, and deſigned and etched the figures of his *Jeruſalem Delivered*. He died at Genoa, in 1629.

(2.) Castelli, Valerius, one of Bernard's ſons, was born at Genoa in 1625, and ſurpaſſed his father. He particularly excelled in painting battles; which he compoſed with ſpirit, and executed with a pleaſing variety, and great freedom of hand. His horſes are admirably drawn, and thrown into attitudes, natural and becoming, full of motion, action, and life. He died in 1659. His works are not very common, but deſervedly held in high eſteem. It is ſaid that a greater number of his eaſel pictures are in the collections of the nobility and gentry of England, than in any other part of Europe.

CASTELLO-Branco, the capital of Beira in Portugal, ſeated on the river Lyra, 35 miles NW. of Alcantara, and 95 NE. of Liſbon. Lon. 8. 5. W. Lat. 39. 35. N.

Castello de Vide, a ſmall ſtrong town of Portugal, in Alentejo. It was taken by Philip V. Lon. 6. 25. W. Lat. 39. 15. N.

(1.) Castello di Monte, a town of Italy, in the late republican dep. of Croſtolo, ſituated on a mountain, the water of whoſe wells affords a reddiſh oil, like thoſe of *Barnzone*, a mountain in the dep. of the Mincio, in which wells are dug 100 feet deep, and the oil ſkimmed off the ſurface of the water every fortnight.

(2.) Castello di Monte Gibbio, a town of Italy, in the late republican dep. of Croſtolo, on a mountain whoſe wells afford a yellowiſh oil, which is reckoned better than the red oil above mentioned. Both theſe oils are uſed in medicine, varniſhing, and embalming.

Castello-Rodrigo, a town of Portugal, in Tra-los-Montes, 30 miles W. of Cividad Rodrigo, in Spain. Lon. 6. 22. W. Lat. 41. 40. N.

CASTELLON, a town of Spain, in Catalonia, 5 m. NW. of Roſs. Lon 2 58 E. Lat. 42. 18 N.

CASTELLORUM operatio, caſtle work, or ſervice and labour done by inferior tenants for the building and upholding of caſtles of defence: towards which ſome gave perſonal aſſiſtance, and others paid their contributions. This was one of the 3 neceſſary charges to which all lands among the Anglo-Saxons were expreſsly ſubject.

CASTELLUM, [Lat. *i. e.* a little caſtle,] originally ſeems to have ſignified a ſmall fort for a little garriſon: though Suetonius uſes the word where the fortification was large enough to contain a cohort. The *caſtella*, according to Vegetius, were often like towns, built on the borders of the empire, and where there were conſtant guards, and fences againſt the enemy. Horſley takes them for much the ſame with *ſtations*.

Castel Mucchio, or Muschio, a populous town of Italy, in the iſland of Veglia, N. of Veglia, half a mile from the coaſt, with a harbour capable of containing 100 galleys. It contains above 12,000 inhabitants.

CASTELNAU, the name of 7 towns of France, which are diſtinguiſhed as follows:

1. Castelnau de Barbarens, in the department of Gers, and ci-devant province of Armagnac.

2. Castelnau de Brassac, in the department of Upper Garonne, and ci-devant province of Upper Languedoc.

3. Castelnau de Bretenous, in the department of Lot, and ci-devant province of Querci.

4. Castelnau d'Estefond, in the department of Upper Garonne, and ci-devant province of Upper Languedoc.

5. Castelnau de Magnioc, in the department of Gers, and ci-devant province of Armagnac.

6. Castelnau de Montartier, in the department of Lot, and ci-devant province of Querci.

7. Castelnau de Montmereil, in the department of Upper Garonne, and ci-devant territory of Albigeois.

CASTELNAUDARY, a conſiderable town of France, in the department of Aude, and ci-devant province of Lower Languedoc. It is ſeated on an eminence, at the foot of which is a large baſin of the (ci-devant Royal) canal; 15 miles W. of Carcaſſone. Lon. 2. 0. E. Lat. 43. 19. N.

CASTEL-NOVO, or (1.) CASTEL-NUOVO, a ſtrong town of Lower Dalmatia, ſtrongly fortified in the ancient manner; with walls and turrets, containing a church, an hoſpital, 3 monaſteries, and 1800 ſouls. It lies on the gulph of Cataro. Lon. 18. 29. E. Lat. 42. 36. N.

(2.) Castle-nuovo di carfagnana, a town of Italy, in the Modeneſe, with a ſtrong fort, included in the late republican dep. of Appenines. It is the capital of the valley of Carfagnana, and is ſeated on the Serchio, 17 miles above Lucca. Lon. 10. 40. E. Lat. 44. 5. N.

Castel St Joanne, a town of Italy, in Placentia.

CASTELVETRO, Lewis, a native of Modena, of the 16th century, famous for his *Comment on Ariſtotle's Poetics*. He was proſecuted by the inquiſition for tranſlating a book of Melancthon, into Italian. He retired to Baſil, where he died, 20th Feb. 1571.

* CASTER. *n. ſ.* [from *To caſt*.] 1. A thrower; he that caſts.—

If, with this throw, the ſtrongeſt *caſter* vye,
Still, further ſtill, I bid the diſcus fly. *Pope.*

2. A calculator; a man that calculates fortunes.—Did any of them ſet up for a *caſter* of fortunate figures, what might he not get by his predictions? *Addiſon.*

* CASTERIL. See Castrel.

* *To* CASTIGATE. *v. a.* [*caſtigo*, Lat.] To chaſtiſe; to chaſten; to correct; to puniſh.—

If thou didſt put this four cold habit on,
To *caſtigate* thy pride, 'twere well. *Shakeſ.*

(1.) * CASTIGATION. *n. ſ.* [from *To caſtigate.*] 1. Penance; diſcipline.—

This hand of yours requires
A ſequeſter from liberty; faſting and prayer,
With *caſtigation*, exerciſe devout. *Shakeſpeare.*

2. Puniſhment; correction.—Their *caſtigations* were accompanied with encouragements; which care was taken, to keep me from looking upon as mere compliments. *Boyle.* 3. Emendation; repreſſive remedy.—The ancients had theſe conjectures touching theſe floods and conflagrations, ſo as to frame them into an hypotheſis for the *caſtigation* of the exceſſes of generation. *Hale.*

(2.) CASTIGATION, among the Romans, the puniſhment of an offender by blows, or beating with a wand or ſwitch. Caſtigation was chiefly a military puniſhment; the power of inflicting it on the ſoldiery was given to the tribunes. Some make it of two kinds; the one with a ſtick or cane, called *fuſtigatio;* the other with rods, called *flagellation:* the latter was the moſt diſhonourable.

(3.) CASTIGATIONS, in a literary ſenſe, corrections or emendations of the text of an ancient writer.

(1.) * CASTIGATORY. *adj.* [from *caſtigate.*] Punitive, in order to amendment.—There were other ends of penalties inflicted, either probatory, *caſtigatory*, or exemplary. *Bramhall againſt Hobbs.*

(2.) CASTIGATORY FOR SCOLDS. A woman indicted for being a common ſcold, if convicted, ſhall be placed in a certain engine of correction, called the *trebucket*, *caſtigatory*, or *cucking ſtool;* which, in the Saxon language, ſignifies the *ſcolding ſtool;* though now it is frequently corrupted into the *ducking ſtool;* becauſe when placed therein, ſhe is to be plunged in water for her puniſhment. See BRANK, N° 1.

(1.) CASTIGLIONE, a ſmall, but ſtrong town of Italy, with a caſtle, in the ci-devant Mantueſe, and late republican dep. of Mincio. It was taken by the Germans in 1701, and the French defeated the Imperialiſts near it in 1706. Lon. 10. 29. E. Lat. 43. 23. N.

(2.) CASTIGLIONE, a town of Tuſcany, on a ſalt lake, near the coaſt.

(3.) CASTIGLIONE, a town of Italy, 23 miles E. of Genoa.

(4, 5.) CASTIGLIONE, two towns in the territory of Lucca; the one 18 miles N. and the other 8 SW. of Lucca.

(6—8.) CASTIGLIONE, three towns of Naples; viz. 1. in the late Neapolitan republic, dep. of Crati, 17 miles SW. of Coſenza: 2. in the dep. of Peſcara, 6 miles ESE. of Civita Borella: 3. in the dep. of Selo, 5 miles NE. of Salerno.

(9.) CASTIGLIONE DE GATTI, a town of Italy, in the ci-devant Bologneſe, and late republican dep. of Reno.

(10.) CASTIGLIONE DELLE STIVIERE, a town of Italy in the late, republican dep. of the Mincio, with a caſtle, ſituated on an eminence. A bloody battle was fought here on the 3d Auguſt, 1796, between the French and Auſtrians, which laſted 8 hours, and ended at laſt in favour of the republicans.

(11.) CASTIGLIONE, Francis, ſon of John Benedict, (N° 3.) was bred under his father, and excelled in the ſame ſubjects; and it is thought that many good paintings which were aſcribed to the father, and are frequently ſeen at ſales, or in modern collections, are either originals, or copies by the ſon.

(12.) CASTIGLIONE, John Benedict, a celebrated painter, born at Genoa in 1616. His firſt maſter was John Baptiſt Paggi. Afterwards he ſtudied under Andrew Ferrari; and perfected himſelf under A. Vandyck, who then reſided at Genoa. He painted portraits, hiſtorical pieces, landſcapes, and caſtles: In the latter of which he is ſaid chiefly to have excelled; as well as in fairs, markets, and all kinds of rural ſcenes. We have alſo a great number of his etchings, which are all ſpirited, free, and full of taſte. His drawing of the naked figure, though by no means correct, is in a ſtyle that indicates the hand of a maſter.

CASTIGLIONI, Balthazar, an eminent Italian nobleman, deſcended from an illuſtrious family, and born at his own villa at Caſalico in the duchy of Milan, in 1478. He ſtudied painting, ſculpture, and architecture, and wrote in favour of theſe arts. He excelled ſo much in them, that Raphael Urbino, and Buonaroti, though incomparable artiſts, never thought their works complete without the approbation of Count Caſtiglioni. When he was 26 years of age, Guido Ubaldo, Duke of Urbino, ſent him ambaſſador to Pope Julius II. He was ſent upon a 2d embaſſy to Louis XII. of France, and upon a 3d to Henry VII. of England. After he had diſpatched his buſineſs here, he returned, and began his celebrated work intitled *the Courtier;* which he completed at Rome in 1516. This work is full of moral and political inſtruction; and the ſtile is eſteemed the moſt perfect ſpecimen of the Italian language. A verſion of this work, together with the original Italian, was publiſhed at London in 1727, by A. P. Caſtiglioni, a gentleman of the ſame family. Count Caſtiglioni, was ſent by Clement VII. as his legate to the court of the emperor Charles V. and died at Toledo in 1529.

(1.) CASTILE DEL ORO, or TERRA FIRMA, a large and fertile country, in South America, W. of Oroonoko. See TERRA FIRMA.

(2.) CASTILE, the principal and moſt opulent of the kingdoms into which Spain was formerly divided. It now forms the two provinces of NEW and OLD CASTILE, the former having been recovered from the Moors ſubſequent to the latter.

1. CASTILE, NEW, or TOLEDO, is about 200 miles long, and 184 broad; bounded on the N. by Old CASTILE, on the E. by Arragon and Valencia, on the S. by Murcia and Andaluſia, and on the W. by Leon. It is divided into 3 parts; Argaria to the N. Mancha to the E. and Sierra to the S. Madrid is the capital. It has many rivers, and the air is generally pure and healthy; but the land is mountainous, dry and uncultivated, through the indolence of the inhabitants. The N. part produces fruits and wines, and the S. good paſtures and fine wool. It is divided by a long chain of mountains, which run from E. to W.

2. CASTILE, OLD, is about 192 miles long, and 115 broad; bounded on the S. by New Caſtile, on the E. by Arragon and Navarre, on the N. by

Biſcay and Aſturia, and on the W. by Leon. Burgos is the capital.

(1.) CASTILLAN, a weight uſed in Spain for weighing gold. It is the 100dth part of a pound Spaniſh weight. It is commonly called *a weight of gold* in Spain.

(2.) Castillan, or Castillane, a gold coin current in Spain, worth 14 rials and 16 deniers.

CASTILLARA, a town of Italy, 6 miles NE. of Mantua. Lon. 11. 25. E. Lat. 45. 20. N.

CASTILLON, a town of France, in the department of Gironde, and ci-devant province of Guienne, ſeated on the Dordogne, 25 miles E. of Bourdeaux. It is memorable for a victory obtained by the French over the Engliſh in 1451. Lon. 0. 2. E. Lat. 44. 52. N.

(1.) CASTING, among ſculptors, the taking off caſts and impreſſions of figures, buſts, medals, leaves, &c. The method of taking off caſts of figures and buſts is moſt generally by the uſe of plaſter of Paris, *i. e.* alabaſter calcined by a gentle heat. The advantage of uſing this ſubſtance preferably to others, is, that notwithſtanding a ſlight calcination reduces it to a pulverine ſtate, it becomes again a tenacious and cohering body, by being moiſtened with water, and afterwards ſuffered to dry; by which means either a concave or a convex figure may be given by a proper mould or model to it when wet, and retained by the hardneſs it acquires when dry: and from theſe qualities, it is fitted for the double purpoſe of making both caſts and moulds for forming thoſe caſts. The particular manner of making caſts depends on the form of the ſubject to be taken. Where there are no projecting, parts, or where there are ſuch as form only a right or any greater angle with the principal ſurface of the body, it is very eaſy; but where parts project in leſſer angles, or form a curve inclined towards the principal ſurface of the body, the work is more difficult. The firſt ſtep is the forming the mould. If the original or model be a bas relief, or any other piece of a flat form, having its ſurface firſt well greaſed, it muſt be placed on a proper table, and ſurrounded by a frame, the ſides of which muſt be at ſuch a diſtance from it as will allow a proper thickneſs for the ſides of the mold. As much plaſter as will cover and riſe to ſuch a thickneſs as may give ſufficient ſtrength to the mold, and fill the hollow betwixt the frame and the model, muſt be moiſtened with water, till it be juſt of ſuch conſiſtence as will allow it to be poured upon the model. This muſt be done as ſoon as poſſible; or the plaſter would concrete or ſet, ſo as to become unfit to be uſed. The whole muſt remain in this condition, till the plaſter has attained its hardneſs; and then the frame being taken away, the preparatory caſt or mold thus formed may be taken off from the ſubject entire. Where the original ſubject is of a round or erect form, a different method muſt be purſued; and the mold muſt be divided into ſeveral peices: or if the ſubject conſiſts of detached and projecting parts, it is frequently moſt expedient to caſt ſuch parts ſeparately, and afterwards join them together. Where the original ſubject forms a round, or ſpheroid, or any part of ſuch round or ſpheroid, more than one half the plaſter muſt be uſed without any frame to keep it round the model; and muſt be tempered with water to ſuch a conſiſtence, that it may be wrought with the hand like very ſoft paſte: but though it muſt not be ſo fluid as when prepared for flat figured models, it muſt yet be as moiſt as is compatible with its cohering ſufficiently to hold together: and being thus prepared, it muſt be put upon the model, and compreſſed with the hand, or any flat inſtrument, that the parts of it may adapt themſelves, in the moſt perfect manner, to thoſe of the ſubject, as well as be compact with reſpect to themſelves. When the model is ſo covered to a convenient thickneſs, the whole muſt be left at reſt till the plaſter be firm, ſo as to bear dividing without falling to pieces, or being liable to be put out of its form by ſlight violence; and it muſt then be divided into pieces, in order to its being taken off from the model, by cutting it with a very thin bladed knife; and being divided, muſt be cautiouſly taken of, and kept till dry: but it muſt be always carefully obſerved, before the ſeparation of the parts be made, to notch them croſs the joints, or lines of the diviſion, at proper diſtances, that they may with eaſe and certainty be properly conjoined again; which would be much more precarious and troubleſome without ſuch directive marks. The art of properly dividing the molds, in order to make them ſeparate from the model, requires more dexterity and ſkill than any other thing in the art of caſting; and does not admit of rules for the moſt advantageous conduct of it in every caſe. Where the ſubject is of a round or ſpheroidal form, it is beſt to divide the mold into 3 parts, which will then eaſily come off from the model; and the ſame will hold good of a cylinder, or any regularly curved figure. The mold being thus formed, and dry, and the parts put together, it muſt be firſt greaſed, and placed in ſuch a poſition that the hollow may lie upwards, and then filled with plaſter mixed with water, in the ſame proportion and manner, as directed for caſting the mold: and when the caſt is perfectly dry, it muſt be taken out of the mold, and repaired where it is neceſſary; which finiſhes the operation. Where the model forms curves which interſect each other, the conduct of the operation muſt be varied with reſpect to the manner of taking the caſt of the mold from off the ſubject or model; and where there are long projecting parts, ſuch as legs or arms, they ſhould be wrought in ſeparate caſts. The operator may eaſily judge from the original ſubject, what parts will come off together, and what require to be ſeparated: the principle of the whole conſiſts only in this, that where *under-workings*, as they are called, occur, *i. e.* wherever a ſtraight line, drawn from the baſis or inſertion of any projection, would be cut or croſſed by any part of ſuch projection, ſuch part cannot be taken off without a diviſion; which muſt be made either in the place where the projection would croſs the ſtraight line; or, as that is frequently difficult, the whole projection muſt be ſeparated from the main body, and divided alſo lengthwiſe into two parts: and where there are no projections from the principal ſurfaces, but the body is ſo formed as to render the ſurface a compoſition of ſuch curves, that a ſtraight line being drawn parallel to the ſurface of one part would be cut by the outline, in one or more places, of another part, a diviſion of the whole ſhould be made, ſo as to reduce the parts of it into regular curves, which muſt then be treated as ſuch. In larger maſſes, where there would otherwiſe be a great thickneſs of the plaſter, a *corps* or body may be put within the mold, in order to produce a hollow in the caſt; which both ſaves the expence of the plaſter, and renders the caſt lighter. This corps may be of wood, where the forming a hollow of a ſtraight figure, or a conical one with the baſis outward, will anſwer the end: but if the cavity require to be round, or of any curved figure, the corps cannot be then drawn while entire; and conſequently ſhould be of ſuch matter as may be taken out piece-meal. In this caſe, the corps is beſt formed of clay; which muſt be worked upon wires to give it tenacity, and ſuſpended in the hollow of the mold, by croſs wires lying over the mouth; and when the plaſter is ſufficiently ſet to bear handling, the clay muſt be picked out by a proper inſtrument. Where it is deſired to render the plaſter harder, the water with which it is tempered ſhould be mixed with parchment ſize properly prepared, which will make it very firm and tenacious. In the ſame manner, figures, buſts, &c. may be caſt of lead, or any other metal, in the molds of plaſter: only the expence of plaſter, and the tediouſneſs of its becoming ſufficiently dry, when in a very large maſs, to bear the heat of melted metal, render the uſe of clay, compounded with ſome other proper materials, preferable where large ſubjects are in queſtion. The clay, in this caſe, ſhould be waſhed over till it be perfectly free from gravel; and then mixed with ⅓ or more of fine ſand or ſifted coal aſhes, to prevent its cracking. Whether plaſter or clay be employed for the caſting in metal, it is extremely neceſſary to have the mold perfectly dry; otherwiſe the moiſture, being rarified, will make an exploſion that will blow the metal out of the mold, and endanger the operator. Where the parts of a mold are large, or project much, and conſequently require great tenacity to keep them together, flocks of cloth, prepared like thoſe deſigned for paper hangings, or fine cotton, cut very ſhort, ſhould be mixed with the aſhes or ſand before they are added to the clay to make the compoſition for the mold. The proportion ſhould be according to the degree of coheſion required: but a ſmall quantity will anſwer the end, if the other ingredients of the compoſition be good, and the parts of the mold properly linked together by means of the wires above directed. But theſe materials, being combuſtible, muſt not be mixed in the compoſition for molds, which are intended to receive melted metals. There is a method of taking caſts in metals from ſmall animals, and the parts of vegetables, which may be practiſed for ſome purpoſes with advantage: particularly for the decorating grottoes or rock-work, where nature is imitated. The proper kinds of animals are lizards, ſnakes, frogs, birds or inſects; the caſts of which, if properly coloured, will be exact repreſentations of the originals. This is to be performed by the following method: A *coffin* or proper cheſt for forming the mold being prepared of clay, or 4 pieces of boards fixed together, the animal, or parts of vegetables, muſt be ſuſpended in it by a ſtring; and the leaves tendrils, or other detached parts of the vegetables, or the legs, wings, &c. of the animals, properly ſeparated and adjuſted in their right poſition by a ſmall pair of pincers: a due quantity of plaſter of Paris and calcined talc, in equal quantities, with ſome alumen plumoſum, muſt then be tempered with water to the proper conſiſtence for caſting; and the ſubject from whence the caſt is to be taken, as well as the ſides of the coffin, moiſtened with ſpirit of wine. The coffin muſt then be filled with the tempered compoſition of the plaſter and talc, putting at the ſame time a piece of ſtraight ſtick or wood to the principal part of the body of the ſubject, and pieces of thick wire to the extremities of the other parts, that they may form, when drawn out, after the matter of the mold is properly ſet and firm, a channel for pouring in the melted metal, and vents for the air; which otherwiſe, by the rarefaction it would undergo from the heat of the metal, would blow it out or burſt the mould. In a ſhort time the plaſter and talc will ſet and become hard, when the ſtick and wires may be drawn out, and the frame or coffin in which the mold was caſt taken away: and the mold muſt then be put firſt into a moderate heat, and afterwards, when it is as dry as can be rendered by that degree, removed into a greater; which may be gradually increaſed till the whole be red hot. The animal, or part of any vegetable, which was included in the mold, will then be burnt to a coal; and may be totally calcined to aſhes, by blowing for ſome time gently into the channel and paſſages made for pouring in the metal, and giving vent to the air, which will, at the ſame time that it deſtroys the remainder of the animal or vegetable matter, blow out the aſhes. The mold muſt then be ſuffered to cool gently; and will be perfect; the deſtruction of the ſubſtance of the animal or vegetable having produced a hollow of a figure correſpondent to it: but it may be nevertheleſs proper to ſhake the mold, and turn it upſide down, as well as to blow with bellows into each of the air vents, in order to free it wholly from any remainder of the aſhes; or, where there may be an opportunity of filling the hollow with quickſilver without expence, it will be found a very effectual method of clearing the cavity, as all duſt, aſhes, or ſmall detached bodies will neceſſarily riſe to the ſurface of the quickſilver, and be poured out with it. The mold being thus prepared, it muſt be heated very hot when uſed, if the caſt be made with copper or braſs: but a leſs degree will ſerve for lead or tin: and the matter being poured in, the mold muſt be gently ſtruck; and then allowed to reſt till it be cold: at which time it muſt be carefully taken from the caſt, but without the leaſt force: for ſuch parts of the matter as appear to adhere more ſtrongly, muſt be ſoftened by ſoaking in water, till they be entirely looſened, that none of the more delicate parts of the caſt may be broken off or bent. Where the alumen plumoſum, or talc, cannot be procured, the plaſter may be uſed alone; but it is apt to be calcined by the heat uſed in burning the animal or vegetable from whence the

the caſt is taken, and to become of too incohering and crumbly a texture: or, for cheapneſs, Sturbridge or any other good clay, waſhed over till it be perfectly fine, and mixed with an equal part of ſand, and ſome flocks cut ſmall, may be employed. Pounded pumice-ſtone and plaſter of Paris, taken in equal quantities, and mixed with waſhed clay in the ſame proportion, is ſaid to make excellent molds for this and parallel uſes. Caſts of medals, or ſuch ſmall pieces as are of a ſimilar form, may be made in plaſter by the method directed for bas relievos. Nothing more is required than to form a mold by laying them on a proper board; and having ſurrounded them by a rim made of a piece of card, or paſteboard, to fill the rim with ſoft tempered plaſter of Paris; which mold, when dry, will ſerve for ſeveral caſts. But it is better to form the mold of melted ſulphur; which will produce a ſharper impreſſion in the caſt, and be more durable than thoſe made of plaſter. The caſts are likewiſe frequently made of ſulphur, which being melted muſt be treated exactly in the ſame manner as the plaſter. For taking caſts from medals, Dr Lewis recommends a mixture of brimſtone and red lead: equal parts of theſe are to be put over the fire in a laddle, till they ſoften to the conſiſtence of pap; then they are kindled with a piece of paper, and ſtirred for ſome time. The veſſel being afterwards covered cloſe, and continued on the fire, the mixture grows fluid in a few minutes. It is then to be poured on the medal, previouſly oiled and wiped clean. The caſts are very neat; their colour ſometimes a pretty deep dark, ſometimes a dark grey: they are very durable; and when ſoiled, may be waſhed clean in ſpirit of wine. Dr Letſom recommends tin foil for taking off caſts from medals. The thinneſt kind is to be uſed. It ſhould be laid over the ſubject from which the impreſſion is to be taken, and then rubbed with a bruſh, or a pin, till it has perfectly received the impreſſion. The tin foil ſhould now be pared cloſe to the edge of the medal, till it is brought to the ſame circumference; the medal muſt then be reverſed, and the tin foil will drop off into a chip-box or mold placed ready to receive it. Thus the concave ſide of the foil will be uppermoſt, and upon this plaſter of Paris, prepared in the uſual manner, may be poured. When dry, the whole is to be taken out, and the tin foil ſticking on the plaſter will give a perfect repreſentation of the medal, almoſt equal in beauty to ſilver. If the box or mold is a little larger than the medal, the plaſter running round the tin foil will give the appearance of a white frame or circular border; whence the new made medal will appear more neat and beautiful. Caſts may be made likewiſe with iron, prepared in the following manner: "Take any iron bar, or piece of a ſimilar form; and having heated it red hot, hold it over a veſſel containing water, and touch it very ſlightly with a roll of ſulphur, which will immediately diſſolve it, and make it fall in drops into the water. As much iron as may be wanted being thus diſſolved, pour the water out of the veſſel; and pick out the drops formed by the melted iron from thoſe of the ſulphur, which contain little or no iron, and will be deſtinguiſhable from the other by their colour and weight." The iron will thus be rendered ſo fuſible, that it will run with leſs heat than is required to melt lead; and may be employed for making caſts of medals, and many other ſuch purpoſes, with great convenience and advantage. Impreſſions of medals, having the ſame effect as caſts, may be made alſo of iſinglaſs glue, by the following means. Melt the iſinglaſs, beaten, as commonly uſed, in an earthen pipkin, with the addition of as much water as will cover it, ſtirring it gently till the whole is diſſolved: then with a bruſh of camel's hair, cover the medal, which ſhould be previouſly well cleanſed and warmed, and then laid horizontally on a board or table, greaſed in the part around the medal. Let them reſt afterwards till the glue be properly hardened; and then, with a pin, raiſe the edge of it; and ſeparate it carefully from the medal: the caſt will be thus formed by the glue as hard as horn; and ſo light, that a thouſand will ſcarcely weigh an ounce. In order to render the relief of the medal more apparent, a ſmall quantity of carmine may be mixed with the melted iſinglaſs; or the medal may be previouſly coated with leaf gold by breathing on it, and then laying it on the leaf, which will by that means adhere to it; but the leaf gold is apt to impair a little the ſharpneſs of the impreſſion. Impreſſions of medals may be likewiſe taken in putty; but it ſhould be the true kind made of calx of tin, and drying oil. Theſe may be formed in the molds, previouſly taken in plaſter or ſulphur; or molds may be made in its own ſubſtance, in the manner directed for thoſe of the plaſter. Theſe impreſſions will be very ſharp and hard; but the greateſt diſadvantage that attends them, is their drying very ſlowly, and being liable in the mean time to be damaged.

(2.) CASTING, in foundery, the running a metal into a mould, prepared for that purpoſe. See FOUNDERY.

(3.) CASTING, in natural hiſtory, is applied to various animals: thus deer caſts their horns, ſnakes their ſkins, lobſters their ſhells, hawks their feathers, &c. annually.

(4.) * CASTING-NET. *n.ſ.* [from *caſting* and *net.*] A net to be thrown into the water; not placed and left.—

Caſting-nets did rivers bottoms ſweep. *May's Virg.*

(5.) CASTING OF FEATHERS. See MOULTING.

(6.) CASTING OF HAIR. A horſe caſts his hair, or coat, at leaſt once a-year, viz. in the ſpring when he caſts his winter coat; and ſometimes, at the cloſe of autumn, he caſts his ſummer coat, in caſe he has been ill kept.

(7.) CASTING OF HOOFS. Horſes alſo ſometimes caſt their hoofs, particularly coach horſes brought from Holland. Theſe, being bred in a moiſt marſhy country, have their hoofs too flabby: ſo that coming into a drier ſoil, and leſs juicy provender, their hoofs fall off, and others that are firmer ſucceed.

(1.) * CASTLE. *n.ſ.* [*caſtellum*, Lat.] 1. A ſtrong houſe, fortified againſt aſſaults.—

The *caſtle* of Macduff, I will ſurpriſe. *Shak.*

2. CASTLES *in the air.* [*chateaux d'Eſpagne*, Fr.] Projects without reality.—Theſe were but like *caſtles in the air*, and in men's fancies, vainly imagined. *Raleigh's Hiſtory of the World.*

(2.) CASTLE, (§ 1. *def.* 1.) a fortreſs, or place rendered defenſible either by nature or art. It frequently ſignifies with us the principal manſion of noblemen. In the time of Henry II. there were no leſs than 1115 caſtles in England, each of which contained a manor.

(3.) **Castle**, [*caſtellum*,] in ancient writers, denotes a town or village ſurrounded with a ditch and wall, furniſhed with towers, and guarded by troops. See Castellum.

(4.) **Castle**, or **Castle-steed**, is alſo an appellation given by the country people in the North, to the Roman *caſtella*, as diſtinguiſhed from the *caſtra ſtativa* which they uſually call chesters. Horſley repreſents this as a uſeful criterion, whereby to diſcover or diſtinguiſh a Roman camp or ſtation. There are ſeveral of theſe caſtella on Severus's wall: they are generally 60 feet ſquare; their N. ſide is formed by the wall itſelf which falls in with them; the intervals between them are from 6½ furlongs to 7; they ſeem to have ſtood cloſeſt where the ſtations are wideſt. The neighbouring people call them *caſtles* or *caſtleſteeds*, by which it ſeems probable that their ancient Latin name had been castellum. Some modern writers call them *mile caſtles*, or military *caſtella*; Horſley ſometimes *exploratory caſtles*. In theſe *caſtella* the *areans* had their ſtations, whoſe buſineſs was to make incurſions into the enemy's country, and give intelligence of their motions.

(5.) **Castle**, in ſea language, denotes an elevation on the deck of a veſſel; or a part of the deck, fore and aft, raiſed above the reſt. See Fore-castle, and Hind-castle.

(6.) **Castle**, Edmund. See Castell.

(7.) **Castles, history of ancient English.** Caſtles, walled with ſtone, and deſigned for reſidence as well as defence, are, for the moſt part, according to Mr Groſe, of no higher antiquity than the conqueſt: for although the Saxons, Romans, and even according to ſome writers on antiquity, the ancient Britons had caſtles built with ſtone; yet theſe were both few in number, and at that period, through neglect or invaſions, either deſtroyed or ſo much decayed, that little more than their ruins were remaining. This is aſſerted by many of our hiſtorians and antiquaries, and aſſigned for a reaſon for the eaſe with which William made himſelf maſter of England. This circumſtance led him alſo both with a view to guard againſt invaſions from without, and to awe his newly acquired ſubjects, immediately to begin erecting caſtles all over the kingdom, and likewiſe to repair and augment the old ones; and as he had parcelled out the lands of the Engliſh amongſt his followers, they, to protect themſelves from the reſentment of thoſe ſo deſpoiled, built ſtrong holds and caſtles on their eſtates. This likewiſe cauſed a conſiderable increaſe of theſe fortreſſes; and the turbulent and unſettled ſtate of the kingdom in the ſucceeding reigns, ſerved to multiply them prodigiouſly, every baron or leader of a party building caſtles; inſomuch, that towards the end of king Stephen's reign they amounted to the almoſt incredible number of 1115. As the feudal ſyſtem gathered ſtrength, theſe caſtles became the heads of baronies. Each caſtle was a manor: and its caſtellain, owner, or governor, the lord of it. Markets and fairs were directed to be held there; not only to prevent frauds in the king's duties, but alſo as they were eſteemed places where the laws of the land were obſerved, and as ſuch had very particular privileges. But this good order did not long laſt; for the lords of caſtles began to arrogate to themſelves a royal power, not only within their caſtles, but likewiſe its environs; exerciſing judicature both civil and criminal, coining of money, and arbitrarily ſeizing forage and proviſion for the ſubſiſtence of their garriſons, which they afterwards demanded as a right. At length their inſolence and oppreſſion grew to ſuch a pitch, that according to William of Newbury, "there were in England as many kings, or rather tyrants, as lords of caſtles;" and Matthew Paris ſtyles them, *very neſts of devils and dens of thieves*. Caſtles were not ſolely in the poſſeſſion of the crown and the lay barons, but even biſhops had theſe fortreſſes; though it ſeems to have been contrary to the canons, from a plea made uſe of in a general council, in favour of king Stephen who had ſeized upon the ſtrong caſtles of the biſhops of Lincoln and Saliſbury. This prohibition (if ſuch exiſted) was, however, very little regarded; as in the following reigns many ſtrong places were held, and even defended, by the eccleſiaſtics: neither was more obedience afterwards paid to a decree made by the pope at Viterbo, 28 May 1220, wherein it was ordained, that no perſon in England ſhould keep in his hands more than two of the king's caſtles. The licentious behaviour of the garriſons of theſe places becoming intolerable, in the treaty between king Stephen and Henry II. when only duke of Normandy, it was agreed that all the caſtles built within a certain period ſhould be demoliſhed; in conſequence of which many were actually razed, but not the number ſtipulated. The few caſtles under the Saxon government were probably, on occaſion of war or invaſions, garriſoned by the national militia, and at other times ſlightly guarded by the domeſtics of the great perſonages who reſided therein; but after the conqueſt, when all the eſtates were converted into baronies held by knight's ſervice, caſtle guard coming under that denomination, was among the duties to which particular tenants were liable. From theſe ſervices the biſhops and abbots, who, till the time of the Normans, had held their land in *frank almoign*, or free alms, were, by this new regulation, not exempted: They were, not however, like the laity, obliged to perſonal ſervice, it being ſufficient that they provided fit and able perſons to officiate in their ſtead. This was, however, at firſt ſtoutly oppoſed by Anſelm Abp. of Canterbury; who being obliged to find ſome knights to attend William II. in his wars in Wales, complained of it as an innovation and infringement of the rights and immunities of the church. It was no uncommon thing for the Conqueror and the kings of thoſe days, to grant eſtates to men of approved fidelity and valour, on condition that they ſhould perform caſtle guard in the royal caſtles with a certain number of men, for ſome ſpecified time; and ſometimes they were likewiſe bound by their tenures to keep in repair and guard ſome particular tower or bulwark, as was the caſe at Dover caſtle. In proceſs of time theſe ſervices were commuted for annual rents, ſometimes ſtyled

CAPSTAN.

Plate LX.

Fig. 1.

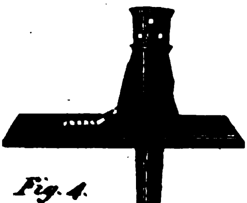


Fig. 2.

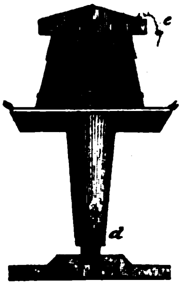


Fig. 3.

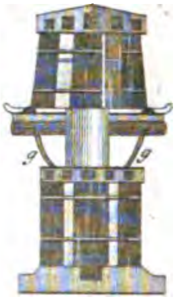


Fig. 4.

Fig. 5.
CASTLE.

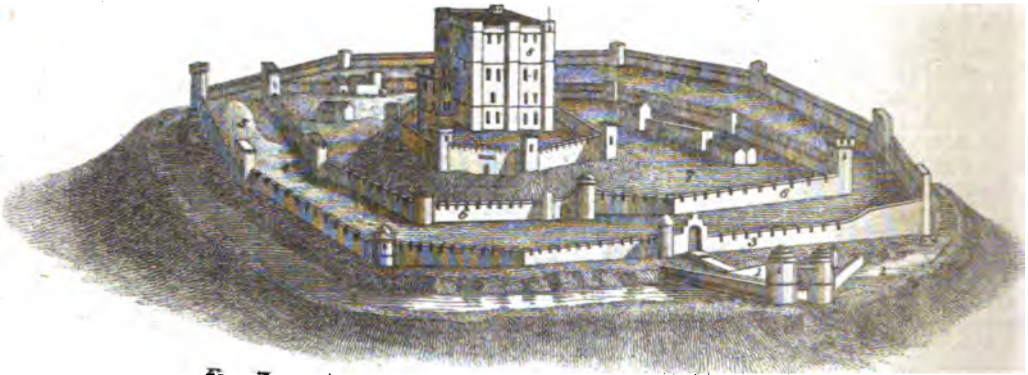


Fig. 7.
Cathead.

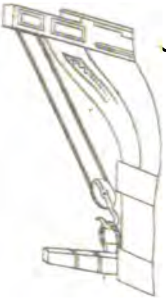
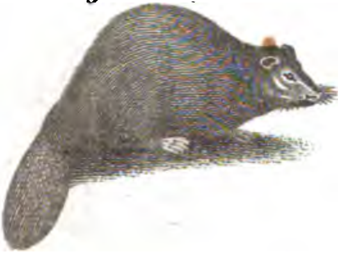
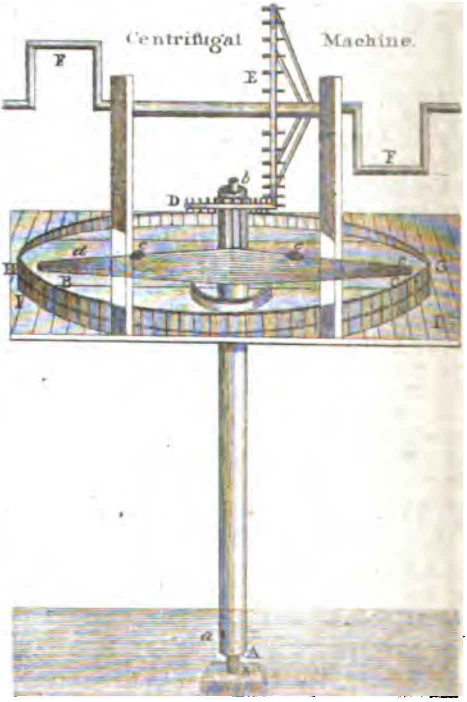


Fig. 6, Caſtor, *the Beaver.*





Centrifugal Machine.

led *ward-penny*, and waytfee, but commonly *caſtle-guard* rents, payable on fixed days, under prodigious penalties called *ſurſizes*. At Rocheſter, if a man failed in the payment of his rent of caſtle-guard on the feaſt of St Andrews, his debt was doubled every tide during the time for which the payment was delayed. Theſe were afterwards reſtrained by an act of parliament made in the reign of king Henry VIII. and finally annihilated, with the tenures by knight's ſervice, in the time of Charles II. Such caſtles as were private property were guarded either by mercenary ſoldiers, or the tenants of the lord or owner. Caſtles which belonged to the crown, or fell to it either by forfeiture or eſcheat (circumſtances that frequently happened in the diſtracted reigns of the feudal times), were generally committed to the cuſtody of ſome truſty perſon, who ſeems to have been indifferently ſtyled governor and conſtable. Sometimes alſo they were put into the poſſeſſion of the ſheriff of the county, who often converted them into priſons. That officer was then accountable at the exchequer, for the farm or produce of the lands belonging to the places entruſted to his care, as well as all other profits: he was likewiſe in caſe of war or invaſion, obliged to victual and furniſh them with munition out of the iſſues of his county; to which he was directed by writ of privy ſeal.

(8.) CASTLES, MATERIALS, FORM, SITUATION, &c. OF. The materials of which caſtles were built, varied according to the places of their erection; but the manner of their conſtruction ſeems to have been pretty uniform. The outſides of the walls were generally built with the ſtones neareſt at hand, laid as regularly as their ſhapes would admit; the inſides were filled up with the like materials, mixed with a great quantity of fluid mortar, which was called by the workmen grout-work. The ſhape or plan of theſe caſtles depended entirely on the caprice of the architects, or the form of the ground intended to be occupied: neither do they ſeem to have confined themſelves to any peculiar figure in their towers; ſquare, round, and polygonal, oftentimes occuring in the original parts of the ſame building. The ſituation of the caſtles of the Anglo-Norman kings and barons, was moſt commonly on an eminence, and near a river; a ſituation on ſeveral accounts eligible. The whole ſite of the caſtle (which was frequently of great extent and irregular figure) was ſurrounded by a deep and broad ditch, ſometimes filled with water, and ſometimes dry, called the *foſſe*. Before the great gate was an outwork, called a BARBACAN, or ANTEMURALE, which was a ſtrong and high wall, with turrets upon it, deſigned for the defence of the gate and draw-bridge. On the inſide of the ditch ſtood the wall of the caſtle, about 8 or 10 feet thick, and between 20 and 30 feet high, with a parapet, and a kind of embraſures, called CRENNELS, on the top. On this wall, at proper diſtances ſquare towers of 2 or 3 ſtories high were built, which ſerved for lodging ſome of the principal officers of the proprietors of the caſtle, and for other purpoſes; and on the inſide were erected lodgings for the common ſervants or retainers, granaries, ſtorehouſes, and other neceſſary offices. On the top of this wall, and on the flat roofs of theſe buildings, ſtood the defenders of the caſtle, when it was beſieged, and from thence diſcharged arrows, darts, and ſtones, on the beſiegers. The great gate of the caſtle ſtood in the courſe of this wall, and was ſtrongly fortified with a tower on each ſide, and rooms over the paſſage, which was cloſed with thick folding doors of oak, often plated with iron, and with an iron portcullis or grate down from above.—Within this outward wall was a large open ſpace or court, called, in the largeſt and moſt perfect caſtles, the *outer bayle*, or *ballium*, in which ſtood commonly a church or chapel. On the inſide of this outer bayle was another ditch, wall, gate, and towers, incloſing the inner bayle or court, within which the chief tower or *keep* was built. This was a very large ſquare fabric, 4 or 5 ſtories high, having ſmall windows in prodigious thick walls, which rendered the apartments within it dark and gloomy. This great tower was the palace of the prince, prelate, or baron, to whom the caſtle belonged, and the reſidence of the conſtable or governor. Under ground was the dungeon, conſiſting of diſmal dark vaults for the confinement of priſoners. In this building alſo was the great hall, in which the owner diſplayed his hoſpitality, by entertaining his numerous friends and followers. At on end of the great halls of caſtles, palaces, and monaſteries, there was a place raiſed a little above the reſt of the floor, called the *déis*, where the chief table ſtood, at which perſons of the higheſt rank dined. Though there was unqueſtionably great variations in the ſtructure of caſtles, yet the moſt perfect and magnificent of them ſeem to have been conſtructed nearly on the above plan. Such, to give one example, was the famous caſtle of Bedford, as appears from the following account of the manner in which it was taken by Henry III. A. D. 1224. The caſtle was taken by 4 aſſaults. "In the firſt was taken the barbican; in the ſecond the outer ballia; at the third attack, the wall by the old tower was thrown down by the miners, where, with great danger, they poſſeſſed themſelves of the inner ballia, thro' a chink; at the fourth aſſault the miners ſet fire to the tower, ſo that the ſmoke burſt out, and the tower itſelf was cloven to that degree, as to ſhow viſibly ſome broad chinks: whereupon the enemy ſurrendered. See Plate LX. Fig. 5. where 1 is the barbacan, 2 the ditch or moat, 3 the wall to the outer ballium, 4 the outer ballium, 5 the artificial mount, 6 the wall of the inner ballium. 7 the inner ballium, 8 the keep or dungeon.

(9.) CASTLES, SCOTTISH. Before the acceſſion of James VI. to the throne of England, the ſituation of Scotland was ſuch, that every baron's houſe was more or leſs fortified, according to the power and conſequence of its lord, or according to the ſituation of the caſtle. Near Edinburgh or Stirling, where the inhabitants were more poliſhed in their manners, and overawed by the ſeat of government, no more was neceſſary than towers capable of reſiſting the curſory attack of robbers and thieves, who never durſt ſtop to make a regular inveſtment, but plundered by ſurpriſe, and if repulſed, inſtantly fled away. Such was Melville Caſtle. It anciently conſiſted of a ſtrong built tower of 3 ſtories, embattled at the top, and was ſufficiently ſtrong to reſiſt any ſudden attack unaided by artillery, or other engines of war. But, when further removed, as in Perthſhire, Inverneſsſhire, or Aberdeenſhire, then it was neceſſary to be better defended, and the aids of a peel or dungeon, with outer walls, moat, and wet ditch, barnakin, &c. added, to enable the powerful lord to reſiſt the formidable attack of his powerful adverſary. The hiſtory of Scotland, ſo late as the reign of the Stuart family, affords many melancholy inſtances of inveterate feuds among the greater and leſſer barons of that period; by which every mode of fortification then in uſe was ſeldom adequate to the defence of the caſtle, againſt the ſtorm or blockade of the enraged chieftain and his clan. The caſtle of Doun ſeems to anſwer this deſcription of fortification, and has made ſeveral gallant defences in the annals of Scotland. The third kind of fortreſſes in Scotland were thoſe ſituated on the borders of England, or on the ſea coaſts of the kingdom, and in the weſtern iſles, and very remote places. Many of the old caſtles in Scotland were ſituated on an iſland, in a deep lake, or on a peninſula, which by a broad deep cut was made an iſland. Of this kind was Lochmaben, in Annandale, the caſtle of Cloſeburn in Nithſdale, the caſtle of the Rive, on the Dee, in Galloway, Lochleven caſtle, and many others. Theſe fortreſſes were only acceſſible in a hard froſt, or by boats which were not eaſily tranſported, by a people deſtitute of good roads and wheel carriages. In fact, they could only be taken by ſurpriſe or blockade; the firſt very difficult, the 2d very tedious; ſo that, before the uſe of artillery, they might be deemed almoſt impregnable. On that account, their ſituation was very deſirable in the inland parts of Scotland. On the ſea coaſts of Scotland we generally find the ſtrongeſt and moſt ancient, as well as the moſt impregnable caſtles. Theſe had to defend themſelves from the invaſion of the foreign enemy, as well as the attacks of the domeſtic foe. Thus we find the barons, whoſe lands extended to the ſea coaſt, perched, like eagles, on the moſt inacceſſible rocks that lay within their poſſeſſions. Of this kind were Slains caſtle, Tantallon, and Dunotter on the E. coaſt, and Dunvegan in the iſle of Sky, with Dunolly on the W. Theſe muſt have been moſt uncomfortable retreats, except to a barbarous people, or when a preſſing danger forced the baron to ſeek his ſafety in the only retreat left him.

Castle-acre, a town in the county of Norfolk, 4 miles NW. of Swaſham, ſo named from its caſtle built in a field. It has fairs 18th April, and 25th July.

Castle-Ashby, a village in Northamptonſhire, W. of Wellingborough.

Castle-Baldwin in Sligo Ireland.

Castle-bar, a populous borough and market town of Ireland, capital of the county of Mayo. It carries on a briſk trade, and has a barrack for a troop of horſe; with a charter ſchool capable of receiving 50 children, endowed with two acres of land, rent-free, by Lord Lucan: who has alſo granted a leaſe of 20 acres more at a pepper corn yearly. Caſtle-bar is memorable for having been the head quarters of Gen. Lake, in Auguſt 1798, when he was attacked by about 800 French troops and a party of the rebels, who obliged him to retreat with the loſs of 20 men and 6 pieces of cannon, and kept poſſeſſion of the place for 20 days afterwards. It is 35 miles N. of Galway. Lon. 9. 25. W. Lat. 53. 45. N.

Castle-beare, a village of England, N. of Great Ealing, Middleſex.

Castle-bellingham, a town of Ireland, in Louth county, Leinſter, 34 miles from Dublin.

Castle-bitham, 3 miles W. of Bourn, Lincolnſhire.

Castle-blakeney, in Galway county, Ireland, 80 miles from Dublin.

Castle-blaney, in Monaghan, Ulſter, 80 miles NW. from Dublin.

Castle-brack, in Queen's county, Leinſter.

Castle-bridge, in Wexford, Leinſter.

Castle-camps, in Cambridge, E. of Linton.

Castle-Carberry, in Kildare, Leinſter, about 26 miles from Dublin, on the borders of the bog of Allen.

Castle Carew, in Pembrokeſhire, near Tenby.

Castle-cargan, or **Cascarrigan**, in Leitrim, Connaught, 84 miles from Dublin.

(1.) **Castle-Cary**, a remarkable Roman ſtation about four miles weſt from Falkirk, on the borders of Stirlingſhire in Scotland. It comprehends ſeveral acres of ground, is of a ſquare form, and is ſurrounded with a wall of ſtone and mortar; all the ſpace within the walls has been occupied by buildings, the ruins of which have raiſed the earth eight or ten feet above its natural ſurface; ſo that the fort now ſeems like an hill-top ſurrounded with a ſunk fence. In 1770, ſome workmen employed in ſearching for ſtones, for the great canal which paſſes near it, diſcovered ſeveral apartments of ſtone; and in one of them a great number of ſtones about two feet in length, and ſtanding erect, with marks of fire upon them, as if they had been employed in ſupporting ſome veſſel under which fire was put. In a hollow of the rock near this place, 1771, a conſiderable quantity of wheat, quite black with age, was found, with wedges and hammers ſuppoſed to have been Roman.

(2.) **Castle-Cary**, a town in Somerſetſhire, 3 miles from Wincanton, 12 SE. of Wells, and 112 W. by S. of London. It has a market on Tueſday, and fairs on Mid Lent and Whitſun Tueſday, and May 1. It has a mineral water like that of Epſom. Lon. 2. 42. W. Lat. 51. 5. N.

Castle-chalamine, } See **Architecture**,
Castle-chonal, } *Index*.

Castle-comb, in Wiltſhire, between Chippenham and Badmington, in Glouceſterſhire, 12 miles NNE. of Bath. It has a fair, May 4. Lon. 2. 45. W. Lat. 51. 30. N.

Castlecomer, in Kilkenny, Leinſter, 45 miles from Dublin. It is remarkable for its collieries, which produce the Kilkenny coals, famous for burning without ſmoke.

Castlecuff, in King's county, Leinſter.

* CASTLED. *adj.* [from *caſtle*.] Furniſhed with caſtles.—

The horſes neighing by the wind is blown,
And *caſtled* elephants o'erlook the town. *Dryd.*

Castle-danis, a hill near S. Columb, Cornwall.

Castle-dawson, a town in Derry, Ireland.

Castlederg, in Tyrone, Ulſter.

Castle-dermot, in Kildare, Leinſter, ſeated on the river Lane, in the road between Cork and Dublin. It is 84 miles SW. from the latter. Lon. 6. 55. W. Lat. 52. 53. N.

Castle-douglas, a village of Scotland, in the county of Kirkcudbright, formerly called **Carlinwark**, but lately erected into a burgh of barony, and named after William Douglas, Eſq. the proprietor, is ſituated at the N. end of Carlinwark Loch. In 1767, it had not 20 inhabitants, but within 30 years after, it contained 800, and is increaſing rapidly. It has a poſt-office, a banking branch, two cotton manufactures, and ſeveral others.

Castle-dykes, one mile S. of Weedon, Northamptonſhire.

Castle-Eaton, 3 miles NW. of Highworth, Wiltſhire.

Castlefin, in Donegal, 107 miles from Dublin.

Castlefreke, in Cork, 3 miles SE. of Roſs.

Castle-goodwin, in Glouceſterſhire, near Painſwick.

Castle-guard, in Louth, Leinſter.

Castle-hacket, a town of Ireland, in Galway county, 97 miles from Dublin.

Castle-haven, a ſafe harbour of Cork, Munſter. Lon. 9. 0. W. Lat. 51. 25. N.

Castle-hean, a town of England in Herefordſhire, at the foot of Hatterel-hill.

Castle-hedingham, 7 miles SW. of Sudbury, Eſſex. A fine tower of its ancient caſtle is ſtill entire.

Castle-hill, 2 villages; 1. in Devonſhire, 6 miles from Tawton: 2. in Warwickſhire, NW. of Kyneton.

Castle Hornock, a town in Cornwall, ſeated on a hill near Penzance.

Castle-how, an artificial hill, in Weſtmoreland, near Tebay.

Castle-howard, a town 10 miles from York.

(1.) **Castle-island**, an iſland of the United States, ſituated in the harbour of Boſton, 3 miles from the town. It contains about 20 acres of ground, and has a houſe for the governor, a jail, barracks, magazine, work-ſhops, &c. It is fortified with 50 pieces of cannon, and commands the entrance of the harbour. In 1792, there were 77 convicts confined in it, who were employed in making nails, and guarded by 60 ſoldiers,

(2.) **Castle-island**, a town of Ireland, in Kerry, Munſter, 8 miles E. of Tralee, 30 miles NW. of Cork, and 133 from Dublin.

Castle-knock, 3 miles from Dublin.

Castle-laghan, in Mayo, Connaught.

Castle-lehan, 12 miles from Cork.

(1.) **Castlemain**, a ſea-port of Kerry, Munſter, 152 miles from Dublin, ſeated on the bay, N° 2.

(2.) **Castlemain bay**, a bay on the coaſt of Kerry, Ireland.

Castle Malcolm's. See **Architecture**, *Index.*

Castle-martyre, a town of Cork, 12 miles SE. of Cork, and 123 from Dublin. Lon. 8. 0. W. Lat. 31. 48. N.

Castle-mill, near Bedford.

Castle-Morris, in Kilkenny, Leinſter.

Castle-Otway, two towns of Ireland: 1. in Limerick: 2. in Tipperary: both in Munſter.

Castle-peveral, in the peak of Derby.

Castle-plunket, in Roſcommon, Connaught, 79 miles from Dublin.

Castle-pollard, in W. Meath, Leinſter, 74 miles from Dublin.

Castle-pooky, in Cork, near Donerail.

Castle-rea, in Roſcommon, Connaught, 84 miles from Dublin.

Castlereagh, in Down county, Ulſter.

Castle-rising, a borough of Norfolkſhire, which ſends two members to parliament. It was formerly a place of ſome note; but its market is now diſuſed, its harbour choaked up, and the caſtle, whence its name, is in ruins. It is 7 miles NE. of Lynn, and 103 NNE. of London. Lon. 0. 30. E. Lat. 52. 50. N.

Castle-rock, in Antrim, Ireland, ſeated on a hill, E. of Carrick-fergus Bay.

Castle-ruff, in Kent, near Milton.

Castle-Sampson, in Roſcommon.

Castle-shane, in Monaghan, Ulſter, 59 miles from Dublin.

* **Castle-soap.** *n. ſ.* [I ſuppoſe corrupted from *Caſtile-ſoap.*] A kind of ſoap.—I have a letter from a ſoap-boiler, deſiring me to write upon the preſent duties on *Caſtle-ſoap. Addiſon.*

Castle-steed, in Cumberland county, NW. of Brampton.

Castle-tellve. See **Architecture**, *Index.*

Castle-thorf, a town near Hanſlop, Bucks.

Castleton, the name of 5 towns in England, viz. 1. in Derbyſhire, by the Peak's Hole: 2. in Dorſetſhire, near Sherborn: 3. in Oxfordſhire, near Glouceſterſhire: 4. in Yorkſhire, Cleveland: and, 5. NW. of Rippon, Yorkſhire.

(1.) **Castletown**, a pariſh of Scotland, in Roxburghſhire, ſo named from an ancient fort, on a precipice 100 feet high; the rampart and foſſe of which are ſtill entire. It was formerly named **Liddisdale**. It is 18 miles long, 14 broad, and triangular in form; containing about 52,160 acres. It contains above a dozen of mountains, ſome of which are 2000 feet high, beſides many hills; and is watered by 6 rivers. The climate is damp, yet healthy, as a proof of which many people arrive at a great age, and one woman died ſome years ago, aged 113. The population in 1801, was 1781, and had increaſed 274 ſince 1755. Among the natural curioſities of this pariſh are ſeveral beautiful caſcades on the Tweeden, and Blackburn; one of which is 37½ feet high and 20 broad; a natural bridge; (See **Bridge**, N° I. § 10.) and a very powerful petrifying water; where large maſſes of petrified matter appear on each ſide, converted into ſolid ſtone. See **Petrifying Waters**. The celebrated Dr Armſtrong was born in this pariſh.

(2.) **Castletown**, a town in the above pariſh, (N° 1.) begun to be erected in 1793, and poſſeſſing many local advantages for manufactures; having water for machinery of any extent; peats within 100 yards, and coals within 3 miles. It is rapidly advancing, and by the plan, will cover 100 acres; conſiſting of two principal ſtreets of 54 feet wide; and ſeveral croſs ſtreets and ſquares. Douglas ſquare is 100 feet wide.

(3.) **Castletown**, the capital of the iſle of Man, ſeated on the SW. part of the iſland. In the centre of the town, on a high rock, is Caſtle-Ruſhen, a magnificent fabric, built of freeſtone in 960 by Guttred, a prince of the Daniſh line, who lies buried in the edifice. It is occupied by the governor of the iſland, and on the ſide of it are the chancery, offices, and good barracks. The diſtance of the harbour, however, which is rocky and ſhallow, renders this place of ſmall importance. Near the town is a fine quarry of black marble, whence the flight of ſteps, leading to St Paul's church in London, was taken. Lon. 4. 35. W. Lat. 53. 55. N.

(4.) **Castletown**, a townſhip of New York, in Richmond county, Staten Iſland, containing 961 citizens, (of whom 114 were electors,) and 114 ſlaves, in 1790.

(5—8.) **Castletown** is alſo the name of four towns in Ireland; viz. 1. in Cork, 110 miles from Dublin: 2. in Kildare, 9 miles from Dublin: 3. in Louth: and, 4. in Queen's county, 48 miles from Dublin.

Castletown-Delvin, in W. Meath, Leinſter; 35 miles from Dublin.

Castletown-Geoghan, in W. Meath.

Castletown-lands, in Mayo, Connaught.

Castletown-Macenery, in Limerick.

Castletown-Roche, in Cork, 115 miles from Dublin.

Castle-Troddan. See **Architecture**, *Ind.*

Castle-Vellin, in Down, 65 m. from Dublin.

(1.) **Castle-Ward**, in Down, one mile W. of Stanford.

(2.) * **Castleward**. *n. ſ.* [from *caſtle* and *ward*.] An impoſition laid upon ſuch of the king's ſubjects, as dwell within a certain compaſs of any caſtle, towards the maintenance of ſuch as watch and ward the caſtle. *Cowel.*

Castle-work, ſervice or labour done by inferior tenants, for building and upholding caſtles of defence, toward which ſome gave their perſonal aſſiſtance, and others paid their contributions. This was one of the 3 neceſſary charges to which the Anglo-Saxons were expreſsly ſubject. See **Castle**, § 7.

* CASTLING. *n. ſ.* [from *caſt*.] An abortive.—We ſhould rather rely upon the urine of a *caſtling*'s bladder, a reſolution of crab's eyes, or a ſecond diſtillation of urine, as Helmont hath recommended. *Brown's Vulgar Errours.*

(1.) CASTON, or **Cawston**, a town in Norfolk, 10 miles N. by W. of Norwich, and 113 NE. of London. It has a bridge over the Bure, with a market on Tueſday, and fairs, Jan. 1. April 14, and Aug. 28.

(2.) **Caston**, a village in Hampſhire, between Avington and Kingſworthy.

(I.) CASTOR, in aſtronomy, a moiety of the conſtellation **Gemini**. Its latitude northwards, for the year 1700, according to Hevelius, was 10° 4′ 23″; and its longitude, of Cancer, 16° 4′ 14″. It is alſo called Raſalgenze, Apollo, Aphellan, Avellar, and Anelar.

(II.) **Castor**, in geography, the name of three towns in England; viz.

1. **Castor**, in Lincolnſhire, 20 miles NE. of Lincoln, and 129 N. of London. It was built by Hengiſt, the Saxon general, on a tract of ground, which he encompaſſed with an ox's hide cut into thongs purſuant to a grant of king Vortigern, and was therefore called *Thuang-Caſtor*, i. e. *Thong-Caſtle*. It has a market on Monday, and fairs June 1, and Oct. 23. It lies between Binbrook and Glandford Bridge. Lon. 0. 9. W. Lat. 53. 30. N.

2. **Castor**, in Norfolk, 3 miles S. of Norwich.

3. **Castor**, in Northamptonſhire, 3 miles from Peterborough.

(III.) * **Castor**. *n. ſ.* [*caſtor*, Lat.] 1. A beaver. See **Beaver**.—

> Like hunted *caſtors* conſcious of their ſtore,
> Their waylaid wealth to Norway's coaſt they bring. *Dryden.*

2. A fine hat made of the furr of a beaver.

(IV.) **Castor**, in zoology, the **beaver**, a genus of quadrupeds belonging to the order of glires. The fore-teeth of the upper jaw are truncated, and hollowed in a tranſverſe angular direction. The tops of the fore teeth of the lower jaw lie in a tranſverſe direction; and the tail is depreſſed. There are 3 ſpecies; (Mr Kerr makes only 2,) viz.

1. **Castor fiber**, the common beaver, with a plain ovated tail, found on the banks of the rivers in Europe, Aſia, and America. It has ſhort ears hid in the fur; a blunt noſe; the fore feet ſmall, the hinder large: its length from noſe to tail about 3 feet; tail about one. See *Plate* LX. *fig.* 6. It is from the inguinal glands of this animal that the caſtor is obtained; it is contained in cods or pouches reſembling a dog's teſticles. Nothing equals the art with which theſe animals conſtruct their dwellings. They chooſe a level piece of ground, with a ſmall rivulet running through it. This they form into a pond, by making a dam acroſs; firſt by driving into the ground ſtakes of 5 or 6 feet in length, placed in rows, watting each row with pliant twigs, and filling the interſtices with clay, ramming it down cloſe. The ſide next the water is ſloped, the other perpendicular; the bottom is from 10 to 12 feet thick; but the thickneſs gradually diminiſhes to the top, which is about 2 or 3: the length of theſe dams is ſometimes not leſs than 100 feet. Their houſes are made in the water collected by means of the dam, and are placed near the edge of the ſhore. They are built on piles; are either round or oval; but their tops are vaulted, ſo that their inſide reſembles an oven, the top a dome. The walls are two feet thick, made of earth, ſtones, and ſticks, moſt artificially laid together; and the walls within as neatly plaſtered as if with a trowl. In each houſe are two openings, the one into the water, the other towards the land. The height of their houſes above the water is 8 feet. They often make 2 or 3 ſtories in each dwelling, for the convenience of change in caſe of floods. Each houſe contains from 20 to 30 beavers; and the number of houſes in each pond is from 10 to 25. Each beaver forms its bed of moſs; and each family

forms its magazine of winter proviſions, which conſiſt of bark and boughs of trees. Theſe they lodge under water, and fetch into their apartments as occaſion requires. Lawſon ſays, they are fondeſt of the ſaſſafras, aſh, and ſweet gum. Their ſummer food is leaves, fruits, and ſometimes crabs and craw fiſh; but they are not fond of fiſh. To effect theſe works, a community of 200 or 300 aſſembles; each bears his ſhare in the labour; ſome fall to gnawing with their teeth trees of great ſize, to form beams or piles; others roll the pieces along to the water; others dive, and with their feet ſcrape holes in order to place them in; while others exert their efforts to rear them in their proper places: another party is employed in collecting twigs to wattle the piles with; a 3d in collecting earth, ſtones, and clay; a 4th is buſied in beating and tempering the mortar; others in carrying it on their broad tails to proper places; and with the ſame inſtrument they ram it between the piles, and plaſter the inſide of their houſes. A certain number of ſmart ſtrokes given with their tails, is a ſignal made by the overſeer for repairing to ſuch and ſuch places, either for mending any defects, or at the approach of an enemy; and the whole ſociety attend to it with the utmoſt aſſiduity. Their time of building is early in ſummer; for in winter they never ſtir but to their magazines of proviſions, and during that ſeaſon are very fat. They breed once a-year, and bring forth at the latter end of the winter two or three young at a birth. Beſides theſe aſſociated beavers, there is a variety, called TERRIERS, which either want induſtry or ſagacity to form houſes like the others. They burrow in the banks of rivers, making their holes beneath the freezing depth of the water, and work up for a great number of feet. Theſe alſo form their winter ſtock of proviſions. In hunting the beavers, the ſavages ſometimes ſhoot them, always getting on the contrary ſide of the wind; for they are very ſhy, quick in hearing, and of a keen ſcent. This is generally done when the beavers are at work, or on ſhore feeding on poplar bark. If they hear any noiſe when at work, they immediately jump into the water, and continue there ſome time; and when they riſe, it is at a diſtance from the place where they went in. They ſometimes are taken with traps of poplar ſticks laid in a path near the water; which when the beaver begins to feed upon, they cauſe a large log of wood to fall upon their necks, which is put in motion by their moving of the ſticks, and conſequently requires an ingenious contrivance. The ſavages generally prefer this way of taking them, becauſe it does not damage their ſkins. In winter they break the ice in two places at a diſtance from the houſe, the one behind the other. Then they take away the broken ice with a kind of racket, the better to ſee where to place their ſtakes. They faſten their nets to theſe, which have large meſhes, and ſometimes are 18 or 20 yards in length. When theſe are fixed, they proceed to demoliſh the houſe, and turn a dog therein; which terrifying the beaver, he immediately leaves it, and takes to the water; after which, he is ſoon entangled by the net. The ſkins are very valuable. See BEAVER, § 1, 3. and CASTOREUM, § 1, 2.

2. **CASTOR MOSCHATUS**, with a long, compreſſed, lanceolated tail, and palmated feet. It has a long ſlender noſe like that of a ſhrew mouſe; no external ears, and very ſmall eyes. Length from noſe to tail, 7 inches; of the tail, 8. It is the water rat of Cluſius; and inhabits Lapland, Ruſſia, the banks of the rivers Wolga and the Yaick. It never wanders far from the ſides; is very ſlow in its pace; makes holes in the cliffs, with the entrance far beneath the loweſt fall of the water; works upwards, but never to the ſurface, only high enough to be beyond the higheſt flow of the river: feeds on fiſh: is devoured by the pikes and *ſiluri*, and gives thoſe fiſh ſo ſtrong a flavour of muſk as to render them not eatable; has the ſame ſcent as the former, eſpecially about the tail, out of which is expreſſed a ſort of muſk very much reſembling the genuine kind. The ſkins are put into cheſts among clothes, to drive away moths. At Orenburgh the ſkins and tails ſell for 15 or 20 copees per hundred. They are ſo common near Nizney, Novogorod, that the peaſants bring 500 a piece to market where they are ſold for 1 ruble per hundred. Mr Kerr ranks this ſpecies under the genus of SOREX, or the *Shrews*.

3. **CASTOR ZIBETHICUS**, the muſk rat, with a long, compreſſed, lanceolated tail, and the toes of the feet ſeparated from each other. Length from noſe to tail, one foot; of the tail, 9 inches. This ſpecies inhabits North America, breeds 3 or 4 times in a year, and brings from 3 to 6 young ones at a time. During ſummer the male and female conſort together: at the approach of winter they unite in families, and retire into ſmall round edifices covered with a dome, formed of herbs and reeds cemented with clay: at the bottom are ſeveral pipes through which they paſs in ſearch of food; for they do not form magazines like the beavers: during winter their habitations are covered many feet deep with ſnow and ice; but they creep out and feed on the roots beneath: they quit their old habitations annually, and form new ones: the fur is ſoft and much eſteemed: the whole animal, during ſummer, has a moſt exquiſite ſmell of muſk, which it loſes in winter: perhaps the ſcent is derived from the calamus aromaticus, a favourite food of this animal. Mr Kerr ranks this ſpecies among the MYOCASTORES, a diviſion of the *Murine Quadrupeds*.

(V.) * **CASTOR**, or **CHESTER**, is derived from the Sax. *ceaſter*, a city, town, or caſtle; and that from the Latin *caſtrum*; the Saxons chuſing to fix in ſuch places of ſtrength and figure, as the Romans had before built and fortified. *Gibſon's Camden.*

(VI. 1.) * **CASTOR AND POLLUX.** [In meteorology.] A fiery meteor, which appears ſometimes ſticking to a part of the ſhip, in form of 1, 2, or even 3 or 4 balls. When one is ſeen alone, it is called Helena, which portends the ſevereſt part of the ſtorm to be yet behind; two are denominated *Caſtor* and *Pollux*, and ſometimes Tyndarides, which portend a ceſſation of the ſtorm *Chamb.*

(2.) **CASTOR AND POLLUX** are called by the Spaniards, *San Elmo*; by the French, *St Elme St Nicholas, St Clare, St Helene;* by the Italians *Hermo*; by the Dutch, *Vree Vuuren*. Theſe meteors are rarely ſeen till the tempeſt is nigh ſpent.

When the meteor ſticks to the maſts, yards, &c. they conclude, from the air's not having motion enough to diſſipate this flame, that a profound calm is at hand; if it flutter about, it indicates a ſtorm.

(3.) **Castor and Pollux**, in Pagan mythology, were twin brothers, ſons of Jupiter, by Leda, the wife of Tyndarus king of Sparta. The manner of their birth is rather uncommon. Jupiter being enamoured of Leda, changed himſelf into a beautiful ſwan, and deſired Venus to metamorphoſe herſelf into an eagle; after which the goddeſs purſued the god with apparent ferocity, and Jupiter fled for refuge into the arms of Leda, who was bathing in the Eurotas. Jupiter availed himſelf of his ſituation, and Leda, who was already pregnant, nine months after brought forth two eggs, from one of which iſſued Pollux and Helena, and from the other Caſtor and Clytemneſtra. The two former were the offſpring of Jupiter, and the latter were ſuppoſed to be the children of Tyndarus. Immediately after their birth Mercury carried the two brothers to Pallena, where they were educated; and when they arrived at mature age, they embarked with Jaſon to go in ſearch of the golden fleece; in which expedition both remarkably diſplayed their courage. Pollux conquered and ſlew Amycus, in the combat of the ceſtus, from which he was ever after conſidered the god and patron of boxing and wreſtling; and Caſtor diſtinguiſhed himſelf in the management of horſes. After their return from Colchis, they united in the moſt inviolable friendſhip, and cleared the Helleſpont and neighbouring ſeas of pirates; and hence they have always been conſidered friendly to navigation. In a violent ſtorm, during the Argonautic expedition, two flames of fire were ſeen to play round the heads of the ſons of Leda, and the tempeſt inſtantly ceaſed, and the ſea was calmed; from which their power to protect ſailors has been more firmly believed, and the two fires, ſo frequent in ſtorms have ſince been known by the name of Caſtor and Pollux. The two brothers made war againſt the Athenians to recover their ſiſter Helen, whom Theſeus had carried away; and from their clemency to the conquered they obtained the ſirname of *Anaces*, or benefactors. They were initiated in the ſacred myſteries of the Cabiri, and in thoſe of Ceres at Eleuſis. Having been invited to a feaſt when Lynceus and Idas were going to celebrate ther marriage with Phœbe and Talaira, the daughters of Leucippus, brother to Tyndarus, they became enamoured of the two women whoſe nuptials they were to celebrate, and determined to carry them off and marry them, which ſo provoked Lynceus and Idas, that a battle enſued, wherein Caſtor killed the former, and was killed by the latter. Pollux being immortal, after killing Idas, to revenge the death of his brother, entreated Jupiter to reſtore his beloved Caſtor, or to be himſelf deprived of immortality; and Jupiter allowed Caſtor to ſhare the immortality of his brother. Thus, ſo long as the one was upon earth, the other was detained in the infernal regions, and they lived and died alternately every day; or as others ſay, every ſix months. For this act of fraternal love, Jupiter tranſlated them into the ſkies, where they formed the conſtellation Gemini, one of which ſtars riſes as the other ſets. A martial dance, called the *Pyrrhic* or Castorian dance, was invented in honour of theſe deities; whom the Cephalenſes placed among the Dii Magni, and offered to them white lambs. The Romans alſo paid them particular honours on account of the aſſiſtance they are ſaid to have given them in an engagement againſt the Latins; in which, appearing mounted on white horſes, they turned the ſcale of victory in their favour, for which a temple was erected to them in the forum.

CASTOREA, in botany. See Durnanta.

(1.) * **CASTOREUM.** *n. ſ.* [from *caſtor*. In pharmacy.] A liquid matter incloſed in bags or purſes, near the anus of the caſtor, falſely taken for his teſticles. *Chambers.*

(2.) **Castoreum**, in the materia medica, castor; the inguinal glands of the beaver. The ancients had a notion that it was lodged in the teſticles; and that the animals, when hard preſſed, would bite them off, and leave them to its purſuers, as if conſcious of what they wanted to deſtroy him for. The beſt ſort of caſtor is what comes from Ruſſia. So much is Ruſſian caſtor ſuperior to the American, that two guineas per pound is paid for the former, and only 8s. 6d. for the latter. The Ruſſian caſtor is in large hard round cods, which appear, when cut, full of a brittle, red, liver-coloured ſubſtance, interſperſed with membranes and fibres exquiſitely interwoven. An inferior ſort is brought from Dantzic, and is generally fat and moiſt. The American caſtor, which is the worſt of all, is in longiſh thin cods. Ruſſia caſtor has a ſtrong diſagreeable ſmell; and an acrid, bitteriſh, and nauſeous taſte. Water extracts the nauſeous part, with little of the finer bitter; rectified ſpirit extracts this laſt without much of the nauſeous; proof ſpirit both: water elevates the whole of its flavour in diſtillation: rectified ſpirit brings over nothing. Caſtor is looked upon as one of the antihyſteric medicines: ſome celebrated practitioners, nevertheleſs, have doubted its virtues; and Newman and Stahl declare it inſignificant. Experience, however, has ſhown that the virtues of caſtor are conſiderable, though leſs than they have in general been ſuppoſed.

CASTORIAN dance. See Castor, N° VI. § 3.

CASTOR light-house, is ſituated N. of Yarmouth, in Norfolkſhire.

Castor oil, a valuable medicine, which acts ſo mildly, that a tea ſpoonful may be given to a new born infant at a doſe. See Pharmacy, *Index*.

Castor-trinity, a town in Norfolk, NW. of Yarmouth.

* **CASTRAMETATION.** *n. ſ.* [from *caſtrametor*, Lat.] The art or practice of encamping.

* *To* **CASTRATE.** *v. a.* [*caſtro*, Lat.] 1. To geld. 2. To take away the obſcene parts of a writing.

(1.) * **CASTRATION.** *n. ſ.* [from *caſtrate*.] The act of gelding.—The largeſt needle ſhould be uſed, in taking up the ſpermatick veſſels in *caſtration*. *Sharp's Surgery.*

(2.) **Castration**, in ſurgery, the operation of cutting off the teſticles, and putting a male animal out of a capacity of generation. It is much uſed in Aſia, eſpecially among the Turks, who practiſe it on their ſlaves, to prevent any commerce with their women. The Turks often make a general amputation. Caſtration alſo obtains in Italy, where it is uſed with a view to preſerve the voice for ſinging. See EUNUCH. The Perſians, and other eaſtern nations, have various methods of making eunuchs, different from thoſe which obtain in Europe: for it is not always done among them by cutting, or even colliſion. Cicuta and other poiſonous herbs do the ſame office, as is ſhewn by Paulus Ægineta. Thoſe eunuchiſed in this manner are called *thlibiæ*. There is another ſort named *thlaſiæ*, in whom the genitals are left entire, and only the veins which ſhould feed them are cut; by which means the parts do indeed remain, but ſo lax and weak, as to be of no uſe. Caſtration was for ſome time the puniſhment of adultery. By the laws of the Viſigoths, ſodomites underwent the ſame puniſhment. By the civil law, it is made penal in phyſicians and ſurgeons to caſtrate, even with conſent of the party, who is himſelf included in the ſame penalty, and his effects forfeited. The offence of Mayhem by caſtration is, according to all our old writers, felony; though committed upon the higheſt provocation. See a record to this purpoſe of Henry III. tranſcribed by Sir Edward Coke, 3 Inſt. 62. or Blackſtone's Com. vol. iv. p. 206. Caſtration is ſometimes neceſſary on medical conſiderations, as in mortifications, and ſome other diſeaſes of the teſticles, eſpecially the *ſarcocele* and *variocele*. Some have alſo uſed it in maniac caſes. Caſtration is alſo ſaid to have been practiſed on women. Athenæus mentions, that king Andramytes was the firſt who caſtrated women. Heſychius and Suidas ſay Gyges did the ſame thing. Galen obſerves, that women cannot be caſtrated without danger of life: and Dalechampius, on the forementioned paſſage of Athenæus, holds, that it is only to be underſtood of ſimple padlocking.

(3.) **CASTRATION OF BOOKS**, ſignifies, 1. The taking out ſome leaf, ſheet, or the like, which renders them imperfect and unfit for ſale: 2. The expunging particular paſſages, on account of their obſcenity, profanity, ſeditious tendency, &c.

(4.) **CASTRATION OF BRUTES.** See GELDING, and SPAYING.

(5.) **CASTRATION OF PLANTS** conſiſts in cutting off the *antheræ*, or tops of the ſtamina, before they have attained maturity, and diſperſed their male duſt. This operation has been frequently practiſed by the moderns, with a view to eſtabliſh or confute the doctrine of the ſexes of plants. See BOTANY, § 69—72. It ſucceeds principally on plants, which have their male flowers detached from the female. In ſuch as have both male and female flowers contained within the ſame covers, this operation cannot be eaſily performed without endangering the neighbouring organs.

(1.) * **CASTREL.** CASTERIL. *n.ſ.* A kind of hawk.

(2.) **CASTRELS**, or KESTRELS, reſemble the lanner in ſhape, but the hobby in ſize. They are a ſlow and cowardly kind. Their chief game is the grous, though they will kill a partridge.

CASTRENSES. See CASTRENSIANI.

* **CASTRENSIAN.** *adj.* [*caſtrenſis*, Lat.] Belonging to a camp. *Dict.*

CASTRENSIANI, or CASTRENSES, in antiquity ſervants in the Greek emperor's houſhold, who had the care of what related to his table and cloathing.

CASTRES, a town of France, in the department of Tarn, and ci-devant province of Languedoc, of which it was recently an epiſcopal ſee. It is ſeated on a fine valley on the river Agout. In the reign of Louis XIII. Caſtres was a kind of proteſtant republic; but, in 1629, its fortifications were demoliſhed. Near it are mines of Turquoiſe ſtones. It was the birth place of Rapin de Thoyras, Abel Boyer, and M. Dacier. It is 20 miles S. of Alby, and 35 E. of Thoulouſe. Lon. 2. 20. E. Lat 43. 37. N.

CASTRIANI. See ATHENS, § 7.

CASTRIGG, a town in Cumberland, near Keſwick.

(1.) **CASTRO**, a duchy of Italy, in the late territories of the Pope, which formed part of the Roman republic, and dep. of Cimino.

(2.) **CASTRO**, a town in the above duchy, (N° 1.) on the confines of Tuſcany. It was formerly a biſhop's ſee, but it was deprived of that *privilege*, and deſtroyed in 1646, becauſe the inhabitants had killed their biſhop. It is 40 miles NW. of Rome. Lon. 11. 54. E. Lat. 42. 23. N.

(3.) **CASTRO**, a town of Naples, anciently called CASTRUM MINERVÆ, with a harbour and good trade. It is well fortified and lies 6 miles S. of Otranto. Lon. 18. 31. E. Lat. 40. 16. N.

(4.) **CASTRO**, a town of S. America, capital of the iſland of Chiloe, 180 miles S. of Baldivia. Lon. 82. 8. W. Lat. 43. 5. N.

(5.) **CASTRO**, Peter DE, a celebrated painter, who flouriſhed about the middle of the 17th century. His ſubjects were vaſes, ſhells, muſical inſtruments, gems, veſſels of gold, ſilver, and cryſtal, books, and rich bracelets, &c. His choice and diſpoſition were elegant, and his execution admirable.

(6.) **CASTRO ARAGONE.** See CASTEL ARAGONESE.

(7.) **CASTRO DEL REY**, a town of Spain, in Galicia.

(8.) **CASTRO MARINO**, a ſtrong town of Portugal, in Algarve, on the borders of Andaluſia, near the mouth of the Guadiana, 38 miles E. of Faro, and 55 S. of Beja. Lon. 7. 12. W. Lat. 37. 6. N.

(9.) **CASTRO NOVO**, a town of Italy, in Sicily.

(10.) **CASTRO PALIO.** See PALIO CASTRO.

(11.) **CASTRO VEREGNA**, a town of S. America in Peru, remarkable for its adjacent mines of ſilver, and its healthy climate. It is 125 miles SE. of Lima. Lon. 74. 45. W. Lat. 12. 50. S.

CASTRUCCIO, Caſtracani, a celebrated Italian general, was born at Lucca in Florence, in 1284, and left in a vineyard covered with leaves; where he was found by Dianora, a widow lady, the ſiſter of Antonio, a canon of St Michael in Lucca, who was deſcended from the illuſtrious family of the Caſtracani. The lady having no children, they reſolved to bring him up, and educated him as carefully as if he had been their own. They intended him for a prieſt; but he was ſcarcely 14 years of age when he began to devote himſelf to military ſports, and thoſe violent exerciſes, which ſuited his great ſtrength of body. The GUELFS and GIBELINES then divided all Italy. Franciſco, a conſiderable perſon on the ſide of the Gibelines, obſerving Caſtruccio's uncommon ſpirit, prevailed with Antonio to let him turn ſoldier; on which Caſtruccio was made a lieutenant of a company of foot by Franciſco Guinigi. In his firſt campaign he gave ſuch proofs of his courage and conduct, as ſpread his fame all over Lombardy; and Guinigi, dying ſoon after, committed to him the care of his ſon and his eſtate. Still diſtinguiſhing himſelf by his exploits, he filled his commander in chief with ſuch envy, that he got him impriſoned, in order to be put to death. But the people of Lucca ſoon releaſed him, and afterwards choſe him for their ſovereign prince. The Gibelines conſidered him as the chief of their party; and thoſe who had been baniſhed from their country fled to him for protection, and promiſed, that if he could reſtore them to their eſtates, they would ſerve him ſo effectually that the ſovereignty of their country ſhould be his reward. He entered into a league with the prince of Milan, and he kept his army conſtantly on foot, employing it as beſt ſuited his deſigns. For ſervices he had done the pope, he was made ſenator of Rome, but while there, received news which obliged him to haſten back to Lucca. The Florentines entered into a war with him, but Caſtruccio fought his way through them; and the ſupreme authority of Tuſcany was ready to fall into his hands, when a period was put to his life. In May 1328, he gained a complete victory over his enemies, who amounted to 30,000 foot and 10,000 horſe; in which 22,000 of them were ſlain, with the loſs of near 16,000 of his own men: but as he was returning from the field of battle, tired with the action, and covered with ſweat, he halted a little, in order to thank his ſoldiers as they paſſed, when, the N. wind blowing upon him, he was ſeized with an ague, which carried him off in a few days, in the 44th year of his age. Machiavel, who wrote his life, ſays, that he was not only an extraordinary man in his own age, but would have been ſo in any other. He was of a noble aſpect, and of the moſt winning addreſs; was grateful to his friends, juſt to his ſubjects, terrible to his enemies. No man was more forward to encounter dangers; none more careful to eſcape them. He had an uncommon preſence of mind, and often made repartees with great ſmartneſs. For a ſpecimen, we ſhall mention one. Paſſing one day through a ſtreet, where there was a houſe of bad fame, he ſurpriſed a young man who was juſt coming out, and who, upon ſeeing him, was all over bluſhes; "Friend, (ſaid he,) you ſhould not be aſhamed when you *come out*, but when you *go in*."

(1.) CASTRUM DOLORIS, in writers of the middle age, denotes a catafalco, or a lofty tomb of ſtate, erected in honour of ſome perſon of eminence, uſually in the church where his body is interred; and decorated with arms, emblems, lights, and the like.

(2.) CASTRUM MINERVÆ. See CASTRO, N° 3.

CASTS. See CAST, N° 6, and CASTING, § 1.

CASU, in law, the name of 2 writs, viz.

1. CASU CONSIMILI, a writ of entry granted where a tenant, by courteſy or for life, aliens either in fee, in tail, or for the term of another's life. It is brought by him in reverſion againſt the perſon to whom ſuch tenant does ſo alien, to the prejudice of the reverſioner in the tenant's life time.

2. CASU PROVISO, a writ of entry founded on the ſtatute of Glouceſter, where a tenant in dower aliens the lands ſhe ſo holds in fee, or for life; and lies for the party in reverſion againſt the alience.

(1.) * CASUAL. *adj.* [*caſuel*, Fr. from *caſus*, Lat.] Accidental; ariſing from chance; depending upon chance; not certain.—That which ſeemeth moſt *caſual* and ſubject to fortune, is yet diſpoſed by the ordinance of God. *Raleigh.*—Moſt of our rarities have been found out by *caſual* emergency, and have been the works of time and chance, rather than of philoſophy. *Glanville*

(2.) CASUAL EJECTOR, in law, a nominal defendant, in ejectment, who continues ſuch, until appearance by or for the tenant in poſſeſſion. *Blackſt Com.* iii. 202.

(3.) CASUAL REVENUES, thoſe which ariſe from forfeitures, confiſcations, deaths, attainders, &c.

(4.) CASUAL THEOLOGY, a denomination given to what is more frequently called CASUISTRY.

* CASUALLY. *adv.* [from *caſual*.] Accidentally; without deſign, or ſet purpoſe.—Wool new ſhorn, laid *caſually* upon a veſſel of verjuice, had drunk up the verjuice, though the veſſel was without any flaw. *Bacon.*—I ſhould have acquainted my judge with one advantage, and which I now *caſually* remember. *Dryden.*

* CASUALNESS. *n. ſ.* [from *caſual*.] Accidentalneſs.

(1.) * CASUALTY. *n. ſ.* [from *caſual*.] 1. Accident; a thing happening by chance, not deſign.—With more patience men endure the loſſes that befal them by mere *caſualty*, than the damages which they ſuſtain by injuſtice. *Raleigh's Eſſays.*—That Octavius Cæſar ſhould ſhift his camp that night that it happened to be taken by the enemy, was a mere *caſualty*; yet it preſerved a perſon, who lived to eſtabliſh a total alteration of government in the imperial city of the world. *South.* 2. Chance that produces unnatural death.—It is obſerved in particular nations, that, within the ſpace of two or three hundred years, notwithſtanding all *caſualties*, the number of men doubles. *Burnet.* We find one *caſualty* in our bills, of which, though there be daily talk, there is little effect. *Graunt.*

(2.) CASUALTY, in metallurgy. See CASUALTY.

(3.) CASUALTY, in Scots law. CASUALTIES OF A SUPERIOR, are thoſe duties and emoluments which a ſuperior has a right to demand out of his vaſſal's eſtate, beſides the conſtant yearly duties eſtabliſhed *reddendo* of his charter upon certain caſual events.

CASUARINA, in botany: A genus of the monandria order, belonging to the monœcia claſs of plants. The male has the calyx of the amentum;

the corolla a bipartite ſmall ſcale. The female has a calyx of the amentum, no corolla; the ſtyle is bipartite.

CASUARIUS. See Struthio, N° 2.

(1.) * CASUIST. *n. ſ.* [*caſuiſte*, Fr. from *caſus*, Lat.] One that ſtudies and ſettles caſes of conſcience.—The judgment of any *caſuiſt*, or learned divine, concerning the ſtate of a man's ſoul, is not ſufficient to give him confidence. *South.*—You can ſcarce ſee a bench of porters without two or three *caſuiſts* in it, that will ſettle you the rights of princes. *Addiſon.*

(2.) Casuists. Eſcobar has made a collection of the opinions of all the caſuiſts before him. M. Le Feore preceptor of Louis XIII. called the books of the caſuiſts the art of quibbling with God; which ſeems not far from truth, by reaſon of the multitude of ſubtleties they abound with. Mayer publiſhed a bibliotheca of caſuiſts, containing an account of all the writers on caſes of conſcience, ranged under 3 heads; the firſt comprehending the Lutheran, the ſecond the Calviniſt, and the third the Romiſh, caſuiſts.

* CASUISTICAL. *adj.* [from *caſuiſt*] Relating to caſes of conſcience; containing the doctrine relating to caſes.—What arguments they have to beguile poor, ſimple, unſtable ſouls with, I know not; but ſurely the practical, *caſuiſtical*, that is, the principal, vital, part of their religion ſavours very little of ſpirituality. *South.*

(1.) * CASUISTRY. *n. ſ.* [from *caſuiſt*.] The ſcience of a caſuiſt; the doctrine of caſes of conſcience.—This conceſſion would not paſs for good *caſuiſtry* in theſe ages. *Pope's Odyſſey, Notes.*—

Morality, by her falſe guardians drawn,
Chicane in furs, and *caſuiſtry* in lawn. *Dunciad.*

(2.) Casuistry is drawn partly from natural reaſon or equity; partly from authority of ſcripture, the canon law, councils, fathers, &c. To caſuiſtry belongs the deciſion of all difficulties ariſing about what a man may lawfully do or not do; what is ſin or not ſin; what things a man is obliged to do, to diſcharge his duty, and what he may let alone without breach of it.

CASUS amissionis, in Scots law. In actions proving the tenor of obligations inextinguiſhable by the debtors retiring or cancelling them, it is neceſſary for the purſuer, before he is allowed a proof of the tenor, to condeſcend upon ſuch a *caſus amiſſionis*, or accident by which the writing was deſtroyed, as ſhows it was loſt while in the writer's poſſeſſion.

CASWALD HOW, a village in Cumberland, E. of Whitehaven.

(1.) CASWELL, a county of North Carolina, in Hillſborough diſtrict; bounded on the E. by Perſon; on the N. by Virginia; on the W. by Guilford, and on the S. by Orange county. It contains 7,260 free inhabitants, and 2,736 ſlaves. Leeſburg is the chief town.

(2.) Caswell, a town SW. of Witney, in Oxfordſhire.

CASWIN. See Casbin.

CASWORTH, a town near Doncaſter, Yorkſh.

(1.) * CAT. *n. ſ.* [*katz*, Teuton. *chat*, Fr.] A domeſtick animal that catches mice, commonly reckoned by naturaliſts the loweſt order of the leonine ſpecies.—A *cat*, as ſhe beholds the light, draws the ball of her eye ſmall and long, being covered over with green ſkin, and dilates it at pleaſure. *Peacham.*

(2.) * Cat. *n. ſ.* A ſort of ſhip.

(3.) Cat, in ſea affairs, (§ 2.) a ſhip employed in the coal trade, formed from the Norwegian model. It is diſtinguiſhed by a narrow ſtern, projecting quarters, a deep waiſte, and by having ornamental figures on the prow. Theſe veſſels are generally built remarkably ſtrong, and carry from 400 to 600 tons, or in the language of the mariners, from 20 to 30 *keels* of coals. Cat is alſo a ſort of ſtrong tackle, or combination of pullies, to hook and draw the anchor perpendicularly up to the cat-head. See Cat-head, § 3.

(4.) Cat, in zoology, § 2. See Felis.

(5.) * Cat in the pan. [Imagined by ſome to be rightly written *Catipan*, as coming from *Catipania*. An unknown correſpondent imagines very naturally, that it is corrupted from *Cate in the pan.*]—There is a cunning which we, in England call the turning of the *cat in the pan*; which is, when that which a man ſays to another, he ſays it as if another had ſaid it to him. *Bacon.*

(6.) * Cat o' nine tails. A whip with nine laſhes, uſed for the puniſhment of crimes.—

You dread reformers of an impious age,
Your awful *cat o' nine tails* to the ſtage,
This once be juſt, and in our cauſe engage.

Prologue to Vanbrugh's Falſe Friend.

CATABAPTIST, [from κατα againſt, and βαπτω, to waſh,] a perſon averſe from baptiſm; particularly from that of infants.

CATABASION, [from καταβαινειν, to deſcend,] in the Greek church, a place under the altar wherein the relics are kept.

CATABATHMUS, in ancient geography, a ſteep valley, dividing Egypt from Africa; ſo called from the haſtineſs and precipitation of its decent.

(1.) CATABAW, a river of the United States, which riſes at the foot of the Appalachian mountains, in North Carolina; thence runs E. for near 40 miles; then turns gradually S., afterwards S. by E. and paſſing into South Carolina, where it obtains the name of the Wateree; afterwards unites with the Congaree, and forms the Santee.

(2.) Catabaw, a town of S. Carolina, in the N. part of Camden diſtrict, a few miles E. of the river, (N° 1.) adjoining the diviſional line of North Carolina, near the main road leading from Camden to Charlotte. It is inhabited by the Catabaws, (N° 3.) and the country around it conſiſts of 144,000 acres, granted by the proprietory government of Carolina. Lon. 5. 42. W. Lat. 34. 56. N. from Philadelphia.

(3.) Catabaw Indians, a nation of North Americans, who inhabit the above town and diſtrict, (N° 2.) They are about 450 in number; of whom 156 are warriors. They were for many years at war with the Six Nations, and were reckoned the moſt formidable of their enemies. They often penetrated into their country, which it is ſaid no Southern or Weſtern tribe ever did. The Six nations always conſidered them as not only the braveſt, but the moſt generous of their enemies; until they were ſurrounded by the white people ſince which time they have degenerated.

CATABIBAZON, in aſtronomy, the moon's deſcending node; called alſo DRAGON'S TAIL.

CATABULENSES, in the middle age, a ſort of miniſters of the empire, appointed to conduct the public carriage from one CATABULUM, or ſtage to another. The catabulenſes alſo had the charge of conveying the public corn to and from the mills: whence in the Theodocian code, they are joined with bakers.

CATABULUM, in the middle age, a kind of ſtable, wherein beaſts, eſpecially of burden and carriage, were kept for the public ſervice. The ancient Chriſtians were ſometimes condemned to ſerve in the catabula, that is to work at the cleaning of them, attending the beaſts, &c.

CATAC, in botany, a name by which ſome authors call agrimony. See AGRIMONIA.

CATACATHARTIC, *adj.* purging downwards.

CATACAUSTIC CURVES, in geometry, that ſpecies of cauſtic curves which are formed by reflection. See FLUXIONS.

(1.) CATACHRESIS, in rhetoric, a trope which borrows the name of one thing to expreſs another: Thus Milton, deſcribing Raphael's deſcent from the empyreal heaven to paradiſe, ſays,

" Down thither prone in flight,
" He ſpeeds, and through the vaſt etherial ſky
" *Sails* between worlds and worlds."

(2.) * CATACHRESIS. *n. ſ.* [καταχρεσις, abuſe.] It is, in rehtorick, the abuſe of a trope, when the words are too far wreſted from their native ſignification, or when one word is abuſively put for another, for want of the proper word; as, *a voice* beautiful *to the ear*. *Smith's Rhetoric.*

* CATACHRESTICAL. *adj.* [from *catachreſis.*] Contrary to proper uſe; forced; far fetched.—A *catachreſtical* and far derived ſimilitude it holds with men, that is in a bifurcation. *Brown's Vulgar Errours.*

CATACLASIS, [from κατακλαω, I diſtort.] in medicine, denotes a diſorder of the eye, wherein the eyelid is inverted by a convulſion of the muſcles that cloſe it.

CATACLEIS, in anatomy, a cartilage in the juncture of the ſhoulder blade.

* CATACLYSM. *n. ſ.* [κατακλυσμος.] A deluge; an innundation; uſed generally for the univerſal deluge.—The opinions that held theſe *cataclyſms* and empyroſes univerſal, was ſuch, as held, that it put a total conſummation unto things in this lower world. *Hale's Origin of Mankind.*

(1.) *CATACOMBS. *n. ſ.* [from κατα and κομβος, a hollow or cavity.] Subterraneous cavities for the burial of the dead; of which there are a great number about 3 miles from Rome, ſuppoſed to be the caves and cells where the primitive chriſtians hid and aſſembled themſelves, and where they interred the martyrs, which are accordingly viſited with devotion. But, anciently, the word *catacomb* was only underſtood of the tombs of St Peter and St Paul.—On the ſide of Naples are the *catacombs*, which muſt have been full of ſtench, if the dead bodies that lay in them were left to rot in open niches. *Addiſon.*

(2.) CATACOMBS OF EGYPT. The method of preſerving the dead in catacombs ſeems to have been common to a number of the ancient nations. The catacombs of Egypt are ſtill extant about 9 leagues from Grand Cairo, and 2 miles from Zaccara. They extend from thence to the pyramids of Pharaoh, which are about 8 miles diſtant. They lie in a field covered with a fine running ſand, of a yellowiſh colour. The country is dry and hilly; the entrance of the tomb is choaked up with ſand; there are many open, but more that are ſtill concealed. The bodies found in the catacombs of Egypt are called MUMMIES; and as their fleſh was formerly reckoned an efficacious medicine, they were much ſought after. In this work the labourers were often obliged to clear away the ſand for weeks together, without finding what they wanted. Upon coming to a little ſquare opening of about 18 feet in depth, they deſcend into it by holes for the feet, placed at proper intervals; and there they are ſure of finding a mummy. Theſe caves, or *wells* as they call them there, are hollowed out of a white free-ſtone, which is found in all this country a few feet below the covering of ſand. When one gets to the bottom of theſe, which are ſometimes 40 feet below the ſurface, there are ſeveral ſquare openings on each ſide into paſſages of 10 or 15 feet wide; and theſe lead to chambers of 15 or 20 feet ſquare. Theſe are all hewn out in the rock; and in each of the catacombs are to be found ſeveral of theſe apartments communicating with one another. They extend a great way under ground, ſo as to be under the city of Memphis, and in a manner to undermine its environs. In ſome of the chambers the walls are adorned with figures and hieroglyphics; in others the mummies are found in tombs, round the apartments hollowed out in the rock. The Egyptians ſeem to have excelled in the art of embalming and preſerving their dead bodies; as the mummies found in the Egyptian catacombs are in a better ſtate than the bodies found either in the Italian catacombs or thoſe of any other part of the world. See EMBALMING and MUMMY.

CATACOMBS OF ITALY. See § 1. Each of theſe catacombs is 3 feet broad, and 8 or 10 high; running in form of an alley or gallery, and communicating with others: in many places they extend within a league of Rome. There is no maſonry or vaulting in them, but each ſupports itſelf: the two ſides, which we may look on as the walls, were the places where the dead were depoſited; which were laid lengthwiſe, 3 or 4 rows over one another; in the ſame catacomb, parallel to the alley. They were commonly cloſed with large thick tyles, and ſometimes pieces of marble, cemented in a manner inimitable by the moderns. Sometimes, though very rarely, the name of the deceaſed is found on the tyle: frequently a palm is ſeen, painted or engraven, or the cipher XP, which is commonly read, χριστο. Though the catacombs of Rome have made the greateſt noiſe of any in the world, there are ſuch belonging to many other cities. Thoſe of Naples, according to biſhop Burnet, are much more noble and ſpacious than the catacombs of Rome. Catacombs have alſo been diſcovered at Syracuſe, Catanea in Sicily, and in the iſland of Malta. The Roman catacombs take particular names from the churches in their neighbourhood, and ſeem to divide the circumference of the city without the walls between them, extending their galleries every where under ground, and a vaſt way from it; ſo that all the ground under Rome, and for many miles about it, ſome ſay ſo, is hollow. The largeſt, and thoſe commonly ſhown to ſtrangers, are the catacombs of San Sebaſtiano, (where the relics of St Peter are ſaid to have been depoſited A. D. 258.) thoſe of St Agneſe, and the others in the fields a little off St Agneſe. Women are only allowed to go into the catacombs in the church-yard of the Vatican on Whitſun-Monday, under pain of excommunication. There are men kept conſtantly at work in the catacombs. As ſoon as theſe labourers diſcover a grave with any of the ſuppoſed marks of a ſaint upon it, intimation is given to the cardinal Comerlingo, who immediately ſends men of reputation to the place, where finding the palm, the monogram, the coloured glaſs, &c. the remains of the body are taken up with great reſpect, and tranſlated to Rome. After the labourers have examined a gallery, they ſtop up the entry that leads to it; ſo that moſt of them remain thus cloſed up; only a few being left open to keep up the trade of ſhewing them to ſtrangers. This they ſay is done to prevent people from loſing themſelves in theſe ſubterraneous labyrinths, which indeed has often happened; but more probably to deprive the public of the means of knowing whether and how far the catacombs extend.

CATACONUM, in ancient architecture, the want of height proportionable to breadth in the chapiter of a pillar.

CATACOUSTICS, [from κατα and ακεω, I hear,] called alſo CATAPHONICS, the ſcience of reflected ſounds, or that part of acouſtics, which conſiders the properties of echoes. See ACOUSTICS, § IV.

CATADIOPTRIC, or CATADIOPTRICAL, } *adj.* [from κατα, againſt, and διοπτομαι, to look through,] belonging to a reflecting teleſcope.

CATADROMUS, [from κατα and δρομος, a race,] in antiquity, a ſtretched ſloping rope in the theatres, down which the FUNAMBULI walked to ſhew their ſkill. Some have taken the word to ſignify the hippodrome or DECURSORIUM, wherein the Roman knights uſed to exerciſe themſelves in running and fighting on horſeback. But the moſt natural meaning is that of a rope faſtened at one end to the top of the theatre, and at the other to the bottom, to walk or run down, which was the higheſt glory of the ancient *ſchænobates* or *funambuli*. Elephants were alſo taught to run down the *catadromus*. Suetonius ſpeaks of the exploit of a Roman knight, who paſſed down the *catadromus* mounted on an elephant's back.

CATADUPA, [from κατα, downwards, and δουπεω, to make a noiſe by falling,] in ancient geography, a cataract in Ethiopia, adjacent to Egypt, where the Nile, which here firſt aſſumes that name, ruſhed down a ſteep rock into a ſubjacent plain, with a noiſe ſo impetuous, that the inhabitants are ſaid to have loſt all ſenſe of hearing. *Plin. Hiſt. Nat. lib.* v. *cap.* 9. *Ammian. Marc. lib.* xxii. *cap.* 34, &c.

CATADUPI, [Καταδουποι,] an appellation given by the ancients to the inhabitants about the cataracts of the Nile. See laſt article. They were ſaid to have been all deaf; being made ſo by the continual din of the falling waters.

CATAFALCO, [Ital. a ſcaffold,] a decoration of architecture, ſculpture, and painting; raiſed on a timber ſcaffold, to ſhew a coffin, or tomb, in a funeral ſolemnity.

CATAGMA, in ſurgery, a fracture of a bone.

* CATAGMATICK. *ad.* [καταγμα, a fracture.] That which has the quality of conſolidating the parts.—I put on a *catagmatick* emplaſter, and, by the uſe of a laced glove, ſcattered the pituitous ſwelling, and ſtrengthened it. *Wiſeman's Surgery.*

CATAGOGION, a heathen feſtival at Epheſus, celebrated on the 22d of January, in which the devotees ran about the ſtreets, dreſſed in divers antic and unſeemly manners, with huge cudgels in their hands, and carrying with them the images of their gods; in which guiſe they raviſhed the women they met with, abuſed and often killed the men, and committed many other diſorders, to which the religion of the day gave a ſanction.

CATAGRAPHA, in antiquity, denote oblique figures or views of men's faces; anſwering to what the moderns call PROFILES. They are ſaid to have been the invention of Simon Cleonæus, who firſt taught painters to vary the looks of their figures, and ſometimes direct them upwards, ſometimes downwards, and ſometimes ſideways or backwards.

CATAHOOCHEE, a large navigable river of the United States, in Georgia, which riſes in the Appalachian mountains, and running S. through an extenſive and fertile country, belonging to the Creek Indians, unites with the Flint, in lat. 31°, and forms the APPALACHICOLA.

CATAIAN, a perſon of no credit. *Shakeſp.*

CATALAN, a native of Catalonia.

(1.) CATALAUNI, or DUROCATALAUNI, a town of Gallia Belgica: A name rather of the lower age than of claſſical antiquity. Now called CHALONS *ſur Marne.* Lon. 4. 35. E. Lat. 48. 55. N.

(2.) CATALAUNI, the people of CATALAUNI.

CATALECTIC VERSES, in poetry, thoſe which want either feet or ſyllables.

(1.) * CATALEPSIS. *n. ſ.* [καταληψις.] A lighter ſpecies of the apoplexy, or epilepſy.—There is a diſeaſe called a *catalepſis*, wherein the patient is ſuddenly ſeized without ſenſe or motion, and remains in the ſame poſture in which the diſeaſe ſeizeth him. *Arbuthnot.*

(2.) CATALEPSIS, or CATALEPSY, } See MEDICINE, *Index.*

CATALLA, in old law Latin, chattels.

(1.) * CATALOGUE. *n. ſ.* [καταλογος.] An enumeration of particulars; a liſt; a regiſter of things one by one.—Make a *catalogue* of proſperous perſons, and I believe they will be repeated ſooner than the alphabet. *South.*—In the library of MSS. belonging to St Laurence, of which there is a printed *catalogue*; I looked into the Virgil which diſputes its antiquity with that of the Vatican. *Addiſon.*

(2.) CATALOGUES OF BOOKS are arranged in different manners; ſome according to the order of the times when the books were printed, as that of Mattaire; others according to their form and ſize, as the common bookſellers catalogues; others according to the alphabetical order of the authors names, as Hyde's catalogue of the Bodleian library; others according to that of the ſubjects, which are called *real* or *claſſical catalogues*, as thoſe of Lipenius and Draudius; laſtly, others are digeſted in a mixed method, as de Seine's catalogue of cardinal Sluſius's library, which is firſt divided according to the ſubjects or ſciences, and afterwards the books in each are arranged alphabetically. The moſt applauded of all catalogues is that of Thuanus's library, in which are united the advantages of all the reſt. It was firſt drawn up by the two Puteani in the alphabetical order, then digeſted according to the ſciences and ſubjects by Iſhm. Bullialdus, and publiſhed by F. Queſnal at Paris in 1679; and reprinted, though incorrectly, at Hamburgh, in 1704. The books are accurately arranged under their ſeveral ſciences and ſubjects, regard being ſtill had to the nation, ſect, age, &c. of every writer. The beſt and choiceſt books on every ſubject are found in it, and the moſt valuable editions. Yet the catalogue of the Abp. of Rheims's library, made by M. Clement, is not inferior to any publiſhed in our age, either on account of the number and choice of the books, or the method of its diſpoſition. One advantage peculiar to this catalogue is, the multitude of anonymous and pſeudonymous authors detected in it, ſcarce to be met with elſewhere. Some even prefer it to Thuanus's catalogue, as containing a greater variety of claſſes, and books on particular ſubjects. The objects of a catalogue are, that it indicate at the ſame time the order of the authors and of the matters, the form of the books, the number of volumes, the chronological order of the editions, the language in which they are written, and their places in the library; ſo as that all theſe circumſtances may appear at once in the ſhorteſt, cleareſt, and exacteſt manner poſſible.

(3.) CATALOGUES OF THE STARS, are liſts of the fixed ſtars, either diſpoſed in their conſtellations; with the longitudes, latitudes, &c. of each; or according to their right aſcenſions, *i. e.* the order in which they paſs over the meridian. I. The firſt who undertook to reduce the fixed ſtars to a catalogue was Hipparchus, the Rhodian, about A. A. C. 120: in which he made uſe of the obſervations of Timocharis and Ariſtarchus for about 180 years before him. Ptolemy retained Hipparchus's catalogue, containing 1026 fixed ſtars; and made many obſervations with a view to a new catalogue, A. D. 140. About 880, Albategni, a Syrian, brought it down to his time. In 1437, Uleg Beg, king of Parthia and India, made a new catalogue of 1022 fixed ſtars, ſince tranſlated out of Perſian into Latin, by Dr Hyde. The third who made a cataloge from his own obſervations was Tycho Brahe, who determined the places of 777 ſtars for 1600, which Kepler, from other obſervations of Tycho, afterwards increaſed to 1000 in the Rudolphine tables; adding thoſe of Ptolemy omitted by Tycho, and other authors, ſo that his catalogue amounts to above 1160. At the ſame time William IV. of Heſſe, with his mathematicians Chriſtopher Rothmannus and Juſtus Byrgius, determined the places of 400 fixed ſtars by his own obſervations, with their places rectified for A. D. 1593; which Hevelius prefers to Tycho's. Ricciolus, in his *Aſtronomia Reformata*, determined the places of 101 ſtars for 1700, from his own obſervations: for the reſt he followed Tycho's catalogue; altering it where he thought fit. In 1667, Dr Halley, in the iſland of St Helena, obſerved 350 ſouthern ſtars, not viſible in our horizon. The ſame labour was renewed by F. Noel in 1710, who publiſhed a new catalogue of the ſame ſtars for 1687. Bayer, in his *Uranometria*, publiſhed a catalogue of 1160 ſtars, compiled chiefly from Ptolemy and Tycho, in which every ſtar is marked with ſome letter of the Greek alphabet; the biggeſt ſtar in any conſtellation being denoted by the firſt letter, the next by the ſecond, &c. and if the number exceeds the Greek alphabet, the remaining ſtars are marked by letters of the Roman alphabet, which letters are preſerved by Flamſtead, and by Senex on his globes. The celebrated Hevelius compoſed a catalogue of 1888 ſtars, 1553 of which were obſerved by himſelf; and their places were computed for 1660. The laſt and greateſt is the Britannic catalogue compiled from the obſervations of the accurate Mr Flamſtead; who for many years devoted himſelf wholly thereto. As there was nothing wanting either in the obſerver or apparatus, we may look on this as a perfect work ſo far as it goes. It is to be regretted the impreſſion had not paſſed through his own hands: that now extant, was publiſhed by authority, but without the author's conſent: it contains 2734 ſtars. There was another publiſhed in 1725, purſuant to his teſtament, containing no leſs than 3000 ſtars, with their places rectified for 1689: to which is added Mr Sharp's catalogue of the ſouthern ſtars not viſible in our hemiſphere, adapted to 1726. II. The catalogue given by De la Caille, in his Ephemerides for the ten years between 1755 and 1765, printed in 1755, we believe, was the firſt which appeared, in the ſecond form, according to the order of the right aſcenſions; and it contains the right aſcenſions and declinations of 307 ſtars, adapted to the year 1750. Two years after the publication of his Ephemerides, De la Caille publiſhed his *Aſtronomie Fundamenta*, which contains a catalogue of the right aſcenſions and declinations of 398 ſtars, alſo adapted to the beginning of 1750. His *Cælum Auſtrale Stelliferum* was publiſhed in 1763, the year after his death, containing a catalogue of the places of 1942 ſtars, all ſituated to the S. of the tropic of Capricorn, and obſerved by him while he was at the Cape of Good Hope, in 1751 and 1752; their places being likewiſe adapted to the beginning of 1750: and his Ephemerides for the ten years between 1765 and 1775, was alſo publiſhed in 1763; in the introduction to which the places of 515 zodiacal ſtars are given, adapted to the beginning of 1765; all deduced from his obſervations. In the Nautical Almanac for 1773, there is a catalogue of 387 ſtars, in right aſcenſion, declination, longitude and latitude, derived from Dr Bradley's obſervations, and adjuſted to the beginning of 1760; which, with the reſults of about 1200 obſervations of the moon, are all that have yet appeared, of this indefatigable obſerver's multiplied labours. In 1775 there appeared a thin volume, entitled *Opera Inedita*, containing, among other papers of the late Tobias

Mayer, a catalogue of the right aſcenſions and declinations of 998 ſtars, which may be occulted by the moon and planets; the places being adapted to the beginning of 1756. Towards the end of the firſt volume of *Aſtronomical Obſervations made at the Royal Obſervatory, Greenwich,* publiſhed in 1776, Dr Maſkelyne, aſtronomer royal has given a catalogue of the places of 34 principal ſtars, in right aſcenſion and north polar diſtance, adapted to the beginning of 1770; which it may be preſumed are very accurate, being the reſult of ſeveral years obſervations, carefully made with the beſt inſtruments. In 1782, M. Bode of Berlin publiſhed a catalogue of no fewer than 5058 of the fixed ſtars, collected from obſervations made by Flamſtead, Bradley, Hevelius, Mayer, De la Caille, Meſſier, Monnier, D'Arquier, &c. all adapted to the beginning of 1780; with a ſet of maps of the conſtellations, finely engraved. To the above catalogues may be added Dr Herſchel's publiſhed in the *Phil. Tranſ.* for 1782, and 1783; Meſſier's nebulæ and cluſters of ſtars, in the *Connoiſſance des Temps* for 1784; and Herſchel's catalogue of the ſame kind, in the *Phil. Tranſ.* for 1786. *A ſpecimen of a General Aſtronomical Catalogue, in zones of North-polar Diſtance, and adapted to* Jan. 1, 1790, was publiſhed by Mr Francis Wollaſton, in 1789; being a collection from all the before-mentioned catalogues, from Hevelius's downwards, and containing five diſtinct catalogues; viz. Dr Maſkelyne's new catalogue of 36 principal ſtars; a general catalogue of all the ſtars, in zones of north polar diſtance; an index to the general catalogue; a catalogue of all the ſtars in the order of their paſſing the meridian; and a catalogue of zodiacal ſtars, in longitude and latitude. Laſtly, Dr Zach, in 1792, publiſhed at Gotha, *Tabulæ Motuum Solis*; to which is annexed a new catalogue of the principal fixed ſtars, from his own obſervations made in 1787, 1788, and 1790; containing the right aſcenſions and declinations of 381 principal ſtars, adapted to the beginning of 1800. But, III. Beſides the preceding methods of forming CATALOGUES OF STARS, Dr Herſchel has propoſed a new one, accurately to expreſs their *comparative brightneſs*. Aſtronomers have for a long time arranged the ſtars in claſſes of different magnitudes according to their different degrees of brilliancy or luſtre. Conſidering *brightneſs* and *ſize* as ſynonymous terms, the brighteſt ſtars have been claſſed as thoſe of the firſt magnitude; and thoſe inferior in brightneſs, progreſſively ſo in magnitude: but not having any fixed or ſatisfactory ſtandard of luſtre, conſiderable confuſion and uncertainty has attended the ſettling the relative magnitudes of the ſtars. A ſtar marked 1. 2m. is thought to be between the firſt and ſecond magnitude; but 2. 1m. ſignifies that the ſtar is nearly of the ſecond magnitude, its luſtre partaking ſomewhat of that of a ſtar of the firſt order. In aſcertaining ſtars of the 1ſt, 2d, or 3d claſſes, ſuch ſubdiviſions may be of ſome uſe; but the terms 5m, 5.6m, 6.5m, 6m, muſt be very vague and indefinite; and in fact they were found to be ſo by Dr Herſchel, who therefore conſiders this method of pointing out the different luſtre of ſtars as a reference to an imaginary ſtandard. Could any dependence be placed on this method of magnitudes, "it would follow, (ſays Dr Herſchel) that no leſs than 11 ſtars in the conſtellation of the Lion, namely β, ε, π, ξ, *A*, *b*, *c*, *d*, 54, 48, 72, had all undergone a change in their luſtre ſince Flamſtead's time: For if the idea of magnitudes had been a clear one, our author, who marked β 1.2m. and γ 2m. ought to be underſtood to mean that β is larger than γ; but we now find that actually γ is larger than β. Every one of the eleven ſtars which I have pointed out may be reduced to the ſame contradiction." After pointing out various inſtances of the inſufficiency of this method, and of the uncertainty of the concluſions drawn from it, in determining the comparative luſtre of ſtars found not only in Flamſtead's catalogue, but in thoſe of other aſtronomers, Dr Herſchel propoſes a different one, more preciſe and ſatisfactory. "I place each ſtar, (ſays he) inſtead of giving its magnitude, into a ſhort ſeries, conſtructed upon the order of brightneſs of the neareſt proper ſtars. For inſtance, to expreſs the luſtre of D, I ſay CDE. By this ſhort notation, inſtead of referring the ſtar D to an imaginary ſtandard, I refer it to a preciſe and determined exiſting one. C is a ſtar that has a greater luſtre than D, and E is another of leſs brightneſs than D. Both C and E are neighbouring ſtars, choſen in ſuch a manner that I may ſee them at the ſame time with D, and therefore may be able to compare them properly. The luſtre of C is in the ſame manner aſcertained by BCD; that of B by ABC; and alſo the brightneſs of E, by DEF; and that of F by EFG. That this is the moſt natural (continues the Dr) as well as the moſt effectual way to expreſs the brightneſs of a ſtar, and by that means to detect any change that may happen in luſtre, will appear, when we conſider what is requiſite to aſcertain ſuch a change. We can certainly not wiſh for a more deciſive evidence, than to be aſſured by actual inſpection, that a certain ſtar is now no longer more or leſs bright than ſuch other ſtars to which it has been formerly compared; provided we are at the ſame time aſſured that thoſe other ſtars remain ſtill in their former unaltered luſtre. But if the ſtar D will no longer ſtand in its former order CDE, it muſt have undergone a change; and if that order is now to be expreſſed by CED, the ſtar has loſt ſome part of its luſtre; if, on the contrary, it ought now to be denoted by DCE, its brightneſs muſt have had ſome addition. Then, if we ſhould doubt the ſtability of C and E, we have recourſe to the orders BCD and DEF, which expreſs their luſtre; or even to ABC and EFG, which continue the ſeries both ways. Now, having before us the ſeries BCDEF, or if neceſſary even the more extended one ABCDEFG, it will be impoſſible to miſtake a change of brightneſs in D, when every member of the ſeries is found in its proper order except D." In the Dr's journal or catalogue, where the order of the luſtre of the ſtars is fixed, each ſtar bears its own proper name or number; thus, "the brightneſs of the ſtar δ Leonis may be expreſſed by β δ ι Leonis, or better by 94—68—17 Leonis; theſe being the numbers which the three above ſtars bear in the Britiſh catalogue of fixed ſtars." Though this mode of arrangement occurred to Dr Herſchel ſo early as 1782, his other aſtronomical engagements kept him from proſecuting it; but after many trials, he propoſed, in the Tranſactions of the Royal Society of London for 1796, the plan which ſeemed the moſt eligible to him: viz. He uſes numbers inſtead of letters to denote particular ſtars; and in chooſing ſtars by which the luſtre of any particular one is to be expreſſed, his firſt view is directed to perfect equality. If two ſtars appear to be ſimilar both in luſtre and magnitude, he puts down their numbers together, ſeparated only by a point, as 30.24 Leonis; but when two ſtars, which at firſt ſeemed alike in brightneſs, appeared on a longer inſpection to be different, yet the preference continue decidedly in favour of the ſame ſtar, he ſeparates them by a comma, thus, 41,94 Leonis. This order ought not to be varied; nor can three ſuch ſtars as 20, 40, 39, Libræ, admit of a different arrangement. Should the ſtate of the heavens be ſuch as to require a different order in theſe numbers, we may ſurely conclude that a change has taken place in the brightneſs of one or more of them. If two ſtars differ very little in their luſtre, but ſo that the preference of the one to the other cannot be doubted, the numbers by which they are expreſſed are ſeparated by a ſhort line, as 17—70 Leonis, or 68—17—70 Leonis; but if two ſtars differ ſo far in luſtre, as that one or two other ſtars might be interpoſed between them, and ſufficient room left for diſtinction, they are marked by a line and comma, thus, —, or by two lines, as 3,— —41 Leonis: and a greater difference than this is ſignified by a broken line, thus — — —29 Bootis. Theſe marks and diſtinctions, adopted by Dr Herſchel, he obſerves, cannot poſſibly be miſtaken; "a point denoting equality of luſtre; a comma indicating the leaſt perceptible difference; a ſhort line to mark a decided but ſmall ſuperiority; a line and comma, or double line, to expreſs a conſiderable and ſtriking exceſs of brightneſs; and a broken line to mark any other ſuperiority, which is to be looked upon as of no uſe in eſtimations that are intended for the purpoſe of directing changes." That this arrangement is attended with difficulties, is not denied; but its importance and utility more than compenſate for any labour it neceſſarily requires. Numerous diſcoveries of changeable and periodical ſtars might doubtleſs have been made, by this method, which have eſcaped the moſt diligent and accurate aſtronomers. Attending to this arrangement, we might be enabled to reſolve a problem, as the Dr ſuggeſts, in which we are all immediately concerned. "Who, for inſtance, would not wiſh to know what degree of permanency we ought to aſcribe to the luſtre of our ſun? Not only the ſtability of our climates, but the very exiſtence of the whole animal and vegetable creation itſelf, is involved in the queſtion. Where can we hope to receive information on this ſubject but from aſtronomical obſervations? If it be allowed to admit the ſimilarity of ſtars with our ſun as a point eſtabliſhed, how neceſſary will it be to take notice of the fate of neighbouring *ſuns*, in order to gueſs at that of our own! That *ſtar*, which, among the multitude we have dignified by the name of *ſun*, to-morrow may gradually begin to undergo a gradual diminution of brightneſs, like β Leonis, α Ceti, α Draconis, δ Urſæ majoris, and many other diminiſhing ſtars that will be mentioned in my catalogues. It may ſuddenly increaſe, like the wonderful ſtar in the back of Caſſiopeia's chair, and the no leſs remarkable one in the foot of Serpentarius; or gradually come on, like β Geminorum, β Ceti, ζ Sagittarii, and many other increaſing ſtars, for which I alſo refer to my catalogues; and laſtly, it may turn into a periodical one of 25 days duration, as Algol is one of three days, δ Cephei of five, β Lyra of ſix, η Antinoi of ſeven days, and many others as are of various periods." Thus having laid before our readers an explanation of the principle upon which this catalogue is formed, as it appeared in the author's firſt memoir, we muſt, for the particular arrangement, refer to the Dr's own account; and will only obſerve that the catalogue contains nine conſtellations, arranged in alphabetical order, with the comparative brightneſs of the ſtars noted with the greateſt accuracy. The Dr in a ſubſequent paper, publiſhed in the ſame volume, has verified the utility of his method, in the completeſt manner, by experience, and ſhown that there is no permanent change in the brightneſs of the ſtars. Having, in the notes to his firſt catalogue mentioned α Herculis as a periodical ſtar, he has, by a ſeries of obſervations on this ſtar, compared with χ Ophiuchi, which was moſt conveniently ſituated for his purpoſe, not only confirmed this opinion, but aſcertained its period. By theſe obſervations which are arranged in a table, it is determined that this ſtar had gone through four ſucceſſive changes in 241 days; and hence that the duration of its period muſt be about 60 days and a quarter. This is alſo an additional proof of the rotatory motion of the ſtars on their axes. "Dark ſpots, or large portions of the ſurface leſs luminous than the reſt, turned alternately in certain directions, either towards or from us, will account for the phenomena of periodical changes in the luſtre of the ſtars, ſo ſatisfactorily, that we certainly need not look out for any other cauſe." Should it be argued that, as the periods in change of brightneſs in ſome ſtars, ſuch as Algol, β Lyræ, δ Cephei, and η Antinoii, are ſhort, being only 3, 5, 6, and 7 days reſpectively; while thoſe of ο Ceti, and of the changeable ſtar in Hydra, and that in the neck of the Swan, are long, amounting to 331, 394, and 497 days; we therefore cannot aſcribe phenomena ſo various in their duration, to the ſame cauſe,— it may be replied, that the force of this argument is founded on our ſmall acquaintance with the heavenly bodies. α Herculis, which performs a revolution of its changes in 60 days, may now be added to the ſeven ſtars, whoſe periodical changes were before known. "The ſtep from the rotation of α Herculis to that of ο Ceti is far leſs conſiderable than that from the period of Algol to the rotation of α Herculis; and thus a link in the chain is now ſupplied, which removes the objection that aroſe from the vacancy." The change obſervable in the luſtre of the fifth ſatellite of Saturn demonſtrates its rotation; and "this variation of light, owing to the alternate expoſition of a more or leſs bright hemiſphere of this periodical ſatellite, plainly indicates, that the ſimilar phenomenon of a changeable ſtar ariſes from the various luſtre of the different parts of its ſurface, ſucceſſively turned to us by its rotatory motion." Beſides, by means of the ſpots that muſt be admitted to exiſt on the ſurfaces of the ſun and ſtars, we perceive a greater ſimilarity between them. It is farther obſerved, by Dr Herſchel, that the ſtars, beſides a rotatory motion on their axes, may have other movements; ſuch as mutations or changes in the inclination of their axes; which, added to bodies much flattened by quick rotatory motions, or ſurrounded by rings like Saturn, will eaſily account for many new phenomena that then offer themſelves to our extended views."

CATALONIA, a province of Spain, bounded on the N. by the Pyrenean mountains, which divide it from France; by Arragon and Valencia on the W. and by the Mediterranean ſea on the S. and E. It is 155 miles in length, and 100 in breadth. It is watered by a great number of rivers; the principal of which are the Lobregat, the Ter, and the Segra. The air is temperate and healthy; but the land is in general mountainous. It produces, however, corn, wine, oil, pulſe, flax, and hemp, ſufficient for the inhabitants. The mountains are covered with tall trees, ſuch as the oak, the ever-green oak, the beech, the pine, the fir, the cheſnut, &c. cork trees, ſhrubs and medicinal plants. There are ſeveral quarries of marble of all colours, cryſtal, alabaſter, amethyſts, and lapis lazuli. Gold duſt has been found among the ſands of the rivers; and there are mines of tin, iron, lead, alum, vitriol, and ſalt. Coral is alſo fiſhed for on the eaſtern coaſt. The inhabitants are hardy, courageous, active, vigorous, and good ſoldiers, but apt to be diſcontented. The miquelets are a ſort of ſoldiers which guard the paſſes over the mountains, and ought to protect travellers; but if they are not paid to their minds, they ſeldom fail to pay themſelves. The Lobregat divides Catalonia into two parts, the eaſt and weſt, according to their ſituation. This province comprehends 17 territories; two of which are in Rouſillon, and belong to the French. The reſt are ſubject to the Spaniards. The principal towns are Barcelona the capital, Tarragona, Tortoſa, Lerida, Solſonia, Cardona Vich, Girona, Seu d'Urgel, Pui Cerda, and Cervera. Catalonia was the laſt province in Spain, which ſubmitted to Philip in the ſucceſſion war.

CATALOTICS, in ſurgery, applications that cicatrize ulcers.

CATAMENIA, in medicine. See MENSES.

CATAMITE, a boy kept for ſodomitical practices.

* **CATAMOUNTAIN**. *n. ſ.* [from *cat* and *mountain*.] A fierce animal, reſembling a cat.— The black prince of Monomotapa, by whoſe ſide were ſeen the glaring *catamountain*, and the quill-darting porcupine. *Arbuthnot and Pope's Mart. Scriblerus.*

CATANA, or CATINA, in ancient geography, a town of Sicily, oppoſite to Ætna, on the SE. one of the five Roman colonies: anciently built by the people of Naxus, 7 years after the building of Syracuſe, A. A. C. 728. It was the birth place of Carondas, the famous lawgiver. It is now called CATANEA.

CATANADROMOUS. See ANADROMOUS.

CATANANCHE, CANDIA LIONS FOOT: A genus of the polygamia æqualis order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The receptacle is paleaceous: the calyx imbricated; the pappus furniſhed with awns by caliculus of 5 ſtiff hairs. There are three ſpecies, of which the moſt remarkable is the

CATANANCHE CERULEA. It ſends out many long, narrow, hairy leaves, which are jagged on their edges like thoſe of the buckſhorn plantain, but broader; the jags are deeper, and at greater diſtances: theſe lie flat on the ground, turning their points upwards. Between the leaves come out the flower ſtalks, which are in number proportionable to the ſize of the plants; for, from an old thriving root, there are frequently 8 or 10, while young plants do not ſend out above 2 or 3. Theſe ſtalks riſe near two feet high, dividing into many ſmall branches upward, garniſhed with leaves like thoſe below, but ſmaller, and without jags on their edges; each of theſe ſmaller branches are terminated by ſingle heads of flowers, of a fine blue colour. It is a perennial plant, and may be propagated by ſlips, or ſeeds, ſown in ſpring on a bed of common earth; and in autumn following the plants may be removed to the places where they are to remain. The ſeeds ripen in Auguſt. This plant is a pretty ornament in gardens, and is eaſily kept within bounds.

CATANEA, or (1.) **CATANIA**, a city of Sicily, ſeated on the gulph, (N° 2.) near the foot of Mount Ætna. It was founded by the Chalcidians ſoon after the ſettlement of Syracuſe, and enjoyed great tranquillity till Hiero I. expelled the citizens; and after repleniſhing the town with a new ſtock of inhabitants, gave it the name of *Ætna*: immediately after his deceaſe, it regained its ancient name, and its citizens returned to it. Catania fell into the hands of the Romans, among their earlieſt requiſitions in Sicily, and became the reſidence of a prætor. It was adorned with ſumptuous buildings of all kinds, and every convenience was procured to ſupply the natural and artificial wants of life. It was deſtroyed by Pompey's ſon, but reſtored with ſuperior magnificence by Auguſtus. The reign of Decius is famous in the hiſtory of this city for the martyrdom of its patroneſs St Agatha. On every emergency her interceſſion is implored. She is piouſly believed to have preſerved Catania from being overwhelmed by torrents of lava, or ſhaken to pieces by earthquakes: yet its ancient edifices are covered by repeated ſtreams of volcanic matter; and almoſt every houſe, even her own church, has been thrown to the ground. In the reign of William the Good, 20,000 Catanians, with their paſtor at their head, were deſtroyed before the ſacred veil could be properly placed to check the flames. In the laſt century the eruptions and earthquakes raged with redoubled violence, and Catania was twice demoliſhed. See ÆTNA. The prince of Biſcari has been at great pains, and ſpent a large ſome of money, in working down to the ancient town, which, on account of the numerous torrents of lava, that have flowed out of Mount Ætna for theſe laſt thouſand years, is now to be ſought for in dark caverns many feet below the preſent ſurface of the earth. Mr Swinburne informs us, that he deſcended into baths, ſepulchres, an amphitheatre, and a theatre, all very much injured by the various cataſtrophes that have befallen them. They were erected upon old beds of lava, and even built with ſquare pieces of the ſame ſubſtance, which in no inſtance appears to have been fuſed by the contact of new lavas: The ſciarra or ſtones of cold lava, have conſtantly proved as ſtrong a barrier againſt the flowing torrent of fire as any other ſtone could have been, though ſome authors were of opinion that the hot matter would melt the old maſs and incorporate with it. This city has been frequently defended from the burning ſtreams by the ſolid maſs of its own ramparts, and by the air compreſſed between them and the lava; as appears by the torrent having ſtopt within a ſmall diſtance of the walls, and taken another direction. But when the walls were broken or low, the lava collected itſelf till it roſe to a great height, and then poured over in a curve. There is a well at the foot of the old walls of Catania, where the lava, after running along the parapet, and then falling forwards, has produced a very complete lofty arch over the ſpring. The church is a noble fabric. It is accounted the largeſt in Sicily, though neither a porch nor cupola has been erected, from a doubt of the ſolidity of the foundations, which are no other than the bed of lava that ran out of Ætna in 1669, and is ſuppoſed to be full of cavities. The organ is much eſteemed by connoiſſeurs in muſical inſtruments.—Catania, according to Mr Swinburne's account, is reviving with great ſplendor. "It has already (he ſays) much more the features of a metropolis and royal reſidence than Palermo; the principal ſtreets are wide, ſtraight, and well paved with lava. An obeliſk of red granite, placed on the back of an antique elephant of touchſtone, ſtands in the centre of the great ſquare, which is formed by the town-hall, ſeminary, and cathedral. The cathedral erected by the abbot Angerius in 1094, was endowed by earl Roger with the territories of Catania and Ætna, for the ſmall acknowledgment of a glaſs of wine and a loaf of bread offered once a year. It has ſuffered ſo much by earthquakes, that little of the orignal ſtructure remains, and the modern parts have hardly any thing except their materials to recommend them. The other religious edifices of the city are properly ornamented, but in a bad taſte. The ſpirit of building ſeems to have ſeized upon this people, and the prince of Biſcai's example adds freſh vigour to it. It were natural to ſuppoſe men would be backward in erecting new habitations, eſpecially with any degree of luxury, on ground ſo often ſhaken to its centre, and ſo often buried under the aſhes of a volcano; but ſuch is their attachment to their native ſoil, and their contempt of dangers they are habituated to, that they rebuild their houſes on the warm cinders of Veſuvius, the quaking plains of Calabria, and the black mountains of Sciarra at Catania. There is a great deal of activity in the diſpoſition of this people: they know by tradition that their anceſtors carried on a flouriſhing commerce; and that, before the fiery river filled it up, they had a ſpacious convenient harbour, where they now have ſcarce a creek for a felucca: they therefore wiſh to reſtore thoſe advantages to Catania, and have often applied to government for aſſiſtance towards forming a mole and port, an undertaking their ſtrength alone is unequal to; but whether the refuſal originates in the deficiencies of the public treaſury, or the jealouſy of other cities, all their projects have ended in fruitleſs applications. The number of inhabitants dwelling in Catania amounts to 30,000; the Catanians make it double: A conſiderable portion of this number appertains to the univerſity, the only one in the iſland, and the nurſery of all the lawyers." Catania is ſituated 52 miles SW. of Meſſina. Lon. 15. 29. E. Lat. 37. 36. N.

(2.) Catania, gulf of, on the coaſt of Sicily.

CATANIANS, the natives of Catania.

CATANZARO, a city of Naples, the capital of Calabria Ulterior, with a biſhop's ſee. It is the uſual reſidence of the governor of the province, and is ſeated on a mountain near the Gulf of Squillace, 42 miles S. of Cocenza. Lon. 16. 48. E. Lat. 39. 0 N.

CATAPAN, or Catipan, [from Κατιπανω, captain,] a name given by the Greeks, about the 12th century, to the governor of their dominions in Italy.

CATAPASM, [from Κατα and πασσω, to ſprinkle,] a dry medicine, compoſed of a mixture of powders to be ſprinkled on the body.

CATAPELTA, an inſtrument of puniſhment, among the ancients, conſiſting of a kind of preſs, compoſed of planks, between which the criminal was cruſhed to death.

CATAPELTÆ, arrows thrown from the Catapulta.

CATAPHONICS, the ſcience which inveſtigates the properties of reflected ſounds. See Acoustics, Sect. IV.

CATAPHORA, in medicine, the ſame as Coma.

* CATAPHRACT. *n. ſ.* [*cataphracta*, Lat.] A horſeman in complete armour.—

On each ſide went armed guards,
Both horſe and foot before him and behind,
Archers and ſlingers, *cataphracts* and ſpears.
Milt. Agoniſt.

CATAPHRACTA, [from κατα, and φρασσω, to arm,] in the ancient military art, a piece of heavy defenſive armour, formed of cloth or leather, fortified with iron ſcales or links, wherewith ſometimes only the breaſt, ſometimes the whole body, and ſometimes the horſe too, was covered. It was in uſe among the Samaritans, Perſians, and other Barbarians. The Romans alſo adopted it early for their foot; and, according to Vegetius, kept it till the time of Gratian, when the military diſcipline growing remiſs, the Roman foot thought the cataphracts as well as the helmet too great a load to bear, and therefore threw both by, chooſing rather to march againſt the enemy bare-breaſted: by which, in the wars with the Goths, multitudes were deſtroyed.

CATAPHRACTÆ naves, ſhips armed and covered in fight, ſo that they could not be eaſily damaged by the enemy. They were covered over with boards, or planks, on which the ſoldiers were placed to defend them; the rowers ſitting underneath, thus ſcreened from the enemy's weapons.

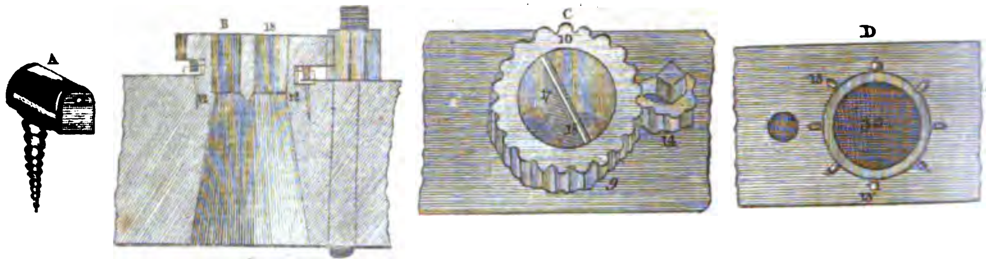


Fig. 2.

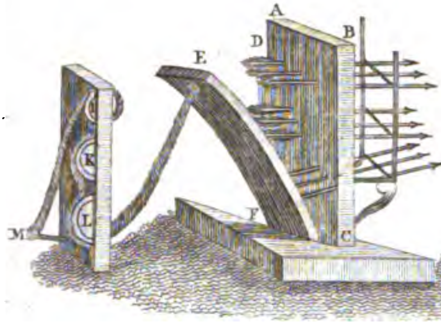


Fig. 1.

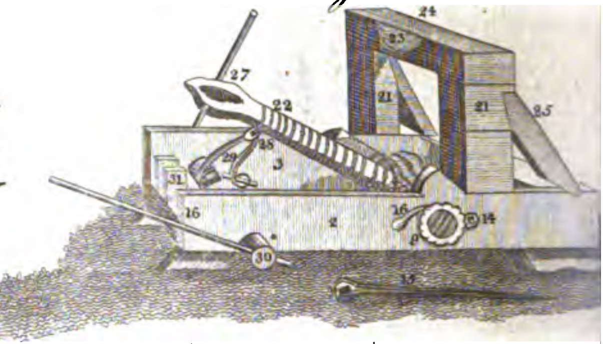


Fig. 6, **CAVIA CAPYBARA.**

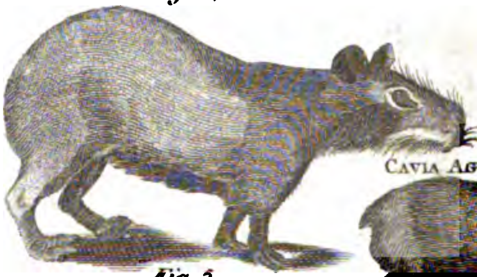


Fig. 3.
CAVIA ACUSCHY,
the Olive Cavy.

Fig. 4,
CAVIA AGUTI CUNICULARIS,
the Lesser Aguti.

Fig. 5,
CAVIA AGUTI LEPORINA,
the Larger Agouti.

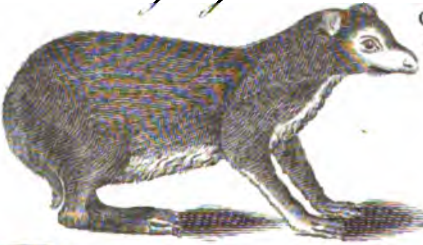


Fig. 7.
CAVIA COBAYA,
or Guinea Pig.

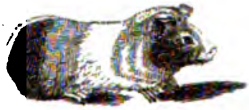


Fig. 8,
CAVIA MAGELLANICA,
the Patagonian Cavy.

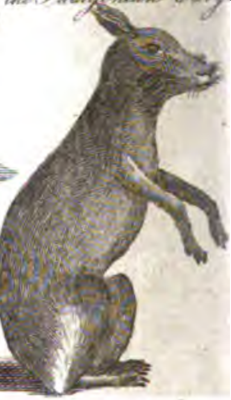
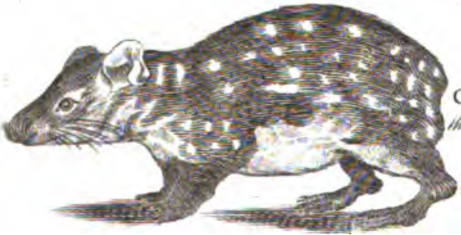


Fig. 9.
CAVIA PACA,
the Spotted Cavy.



CATAPHRACTARII, or CATAPHRACTI EQUITES, were a ſort of cuiraſſiers, not only fortified with armour themſelves, but having their horſes guarded with ſolid plates of braſs or other metals, uſually lined with ſkins and wrought into plumes, or other forms. Their uſe was to bear down all before them, to break in upon the enemies ranks, and ſpread terror and havock wherever they came, as being themſelves invulnerable and ſecure from danger. But their diſadvantage was their unweildineſs, by which, if once unhorſed, they were unable to riſe, and thus fell a prey to the enemy.

CATAPHRACTUS denotes a thing defended or covered on all ſides with armour: more particularly a horſeman or horſe, armed with a cataphracta. See laſt article.

CATAPHRYGIANS, a ſect in the 2d century, ſo called from being originally of Phrygia. They were orthodox in every thing, except that they took Montanus for a prophet, and Priſcilla and Maximilla for true propheteſſes, to be conſulted in every thing relating to religion; as ſuppoſing the Holy ſpirit had abandoned the church. See MONTANIST.

(1.) * **CATAPLASM.** *n. ſ.* [καταπλασμα.] A poultice; a ſoft and moiſt application.—Warm *cataplaſms* diſcuſs, but ſcalding hot may confirm the tumour. *Arbuthnot on Aliments.*

(2.) **CATAPLASMS** take their name ſometimes from the part to which they are applied, or effects they produce; and thus are called *anacollemata, frontalia, epicarpia, epiſpaſtica, veſicatoria*; and when muſtard is an ingredient, they are called *ſinapiſms*. Theſe kind of applications are more eaſy than plaſters or ointments. They are formed of ſome vegetable ſubſtances, and applied of ſuch a conſiſtence as neither to adhere nor run: they are alſo more uſeful when the intention is effected by the perpetuity of the heat or cold which they contain, for they retain them longer than any other kind of compoſition. When deſigned to *relax*, or to promote ſuppuration, they ſhould be applied warm. Their warmth, moiſture, and the obſtruction they give to perſpiration, is the method of their anſwering that end. The proper heat, when applied warm, is no more than to promote a kindly pleaſant ſenſation; for great heat prevents the deſign for which they are uſed. They ſhould be renewed as often as cool. For relaxing and ſuppurating, none excel the white bread poultice, made of the crumb of an old loaf, a ſufficient quantity of milk to boil the bread in, until it is ſoft, and a little oil; which laſt ingredient, beſides preventing the poultice from drying and ſticking to the ſkin, alſo retains the heat longer than the bread and milk alone would do. To preſerve the heat longer, the poultice, when applied, may be covered with a ſtrong ox's bladder. When deſigned to *repel*, they ſhould be applied cold, and ought to be renewed as oft as they become warm. A proper compoſition for this end is a mixture of oat meal and vinegar.

CATAPOTIA, in medicine pills. See PILL.

(1.) * **CATAPULT.** *n. ſ.* [*catapulta*, Lat.] An engine uſed anciently to throw ſtones.—The baliſta violently ſhot great ſtones and quarries, as alſo the *catapults*. *Camden's Remains.*

(2.) **CATAPULT, or (2.) CATAPULTA,** was alſo uſed for throwing arrows and darts, upon the enemy, (ſee § 4.) Some of theſe engines were of ſuch force that they would throw ſtones of 100 weight. Joſephus takes notice of the ſurpriſing effects of theſe engines, and ſays, that the ſtones thrown out of them beat down the battlements, knocked off the angles of the towers, and would level a whole file of men from one end to the other, were the phalanx ever ſo deep. See § 3.

(3.) **CATAPULTA, BATTERING,** is repreſented on *Plate* LXI. This catapulta is ſuppoſed to carry a ſtone, &c. of an hundred weight, and therefore a deſcription of it will be ſufficient to explain the doctrine of all the reſt; for ſuch as threw ſtones of 500 and upwards were conſtructed on the ſame principles. The baſe is compoſed of two large beams, 2, 3. The length of thoſe beams is 15 diameters of the bore of the capitals, 9. At the two extremities of each beam, two double mortiſes are cut to receive the 8 tenons of two croſs beams, each of them 4 of the diameters in length. In the centre of each of the beams of the baſe, and near two thirds of their length, a hole perfectly round, and 19 inches in diameter, ſhould be bored: theſe holes muſt be exactly oppoſite to each other, and ſhould increaſe gradually to the inſide of the beams, ſo that each of them, being 16 inches on the outſide towards the capitals, 9, ſhould be 17½ at the opening on the inſide, and the edges carefully rounded off. The capitals, 9 are, in a manner, the ſoul of the machine, and ſerve to twiſt and ſtrain the cordage, which forms its principle or power of motion. The capitals are of caſt braſs or iron; each conſiſting of a wheel with teeth, C 10, of 2½ inches thick. The hollow or bore of theſe wheels ſhould be 11¼ inches in diameter, perfectly round, and the edges ſmoothed down. As the friction would be too great, if the capitals rubbed againſt the beams, by the extreme ſtraining of the cordage, which draws them towards theſe beams, that inconvenience is remedied by the means of 8 friction wheels, or cylinders of braſs, about the 13th of an inch in diameter, and an inch and one ſixth in length, placed circularly, and turning upon axes, as repreſented at D 13, B 12. One of theſe friction wheels at large with its ſcrew, by which it is faſtened into the beam, is repreſented at A. Upon this number of cylindrical wheels the capitals 9 muſt be placed in the beams, 2, 3, ſo that the cylinders do not extend to the teeth of the wheels, which muſt receive a ſtrong pinion 14. By means of this pinion, the wheel of the capital is made to turn for ſtraining the cordage with the key 15. The capital wheel has a ſtrong catch 16, and another of the ſame kind may be added to prevent any thing from giving way through the extreme and violent force of the ſtrained cordage. The capital piece of the machine is a nut or croſs pin of iron, 17, ſeen at C, and hammered cold into its form. It divides the bore of the capitals exactly in two equal parts, and fixed in groves about an inch deep. This piece, or nut, ought to be about 2⅓ inches thick at the top 18, as repreſented in the ſection at B; and rounded off and poliſhed as much as poſſible, that the cords folded over it may not be hurt or cut by the roughneſs or edges of the iron. Its height ought to be 8 inches, decreaſing gradually in thickneſs to the bottom, where it ought to be only one inch. It muſt be very exactly inſerted in the capitals. After placing the two capitals in the holes of the two beams in a right line with each other, and fixing the two croſs diametrical nuts, or pieces over which the cordage is to wind, one end of the cord is reeved through a hole in one of the capitals in the baſe, and made faſt to a nail within the beam. The other ſide of the chord is then carried through the hole in the oppoſite beam and capital, and ſo wound over the croſs pieces of iron in the centre of the two capitals, till they are full, the cordage forming a large ſkain. The tenſion of the cordage ought to be exactly equal, that is, the ſeveral foldings of the cord over the capital pieces ſhould be equally ſtrained, and ſo near each other, as not to leave the leaſt ſpace between them. As ſoon as the firſt fold or ſkain of cord has filled up one whole ſpace or breadth of the capital pieces, another muſt be carried over it; and ſo on, always equally ſtraining the end till no more will paſs through the capitals, and the ſkain of cordage entirely fils them, obſerving to rub it from time to time with ſoap. At 3 or 4 inches behind the cordage, thus wound over the capital pieces, two very ſtrong upright beams 21 are raiſed; theſe are poſts of oak 14 inches thick, croſſed over at top by another of the ſame ſolidity. The height of the upright beams is 7½ diameters; each ſupported behind with very ſtrong props 25, fixed at bottom in the extremities of the baſe 2, 3. The croſs beam 24 is ſupported in the ſame manner by a prop in the centre. The tree, arm, or ſtylus 22, ſhould be of ſound aſh. Its length is from 15 to 16 diameters of the bore of the capitals. The end of the bottom, or that fixed in the middle of the ſkain, is 10 inches thick, and 14 broad. To ſtrengthen the arm or tree, it ſhould be wrapped round with a cloth dipped in ſtrong glue like the tree of a ſaddle, and bound very hard with waxed thread, of the ſixth of an inch in diameter from the large end at bottom, almoſt to the top, as repreſented in the figure. At the top of the arm, juſt under the iron hand or receiver 27, a ſtrong cord is faſtened, with two loops twiſted one within another, for the greater ſtrength. Into theſe two loops the hook of a braſs pulley 28 is put. The cord 29 is then reeved through the pulley, and faſtened to the roll 30. The cock or trigger 31, which ſerves as a ſtay, is then brought to it, and made faſt by its hook to the extremity of the hand, 27, in which the body to be diſcharged is placed. The pulley at the neck of the arm is then unhooked; and when the trigger is to let it off, a ſtroke muſt be given upon it with an iron bar or crow of about an inch in diameter; on which the arm flies up with a force almoſt equal to that of a modern mortar. The cuſhion or ſtomacher, 23, placed exactly in the middle of the croſs beam 24, ſhould be covered with a tanned ox hide, and ſtuffed with hair, the arm ſtriking againſt it with inconceivable force. It is to be obſerved, that the tree or arm, 22, deſcribes an angle of 90 degrees, beginning at the cock, and ending at the ſtomacher or cuſhion.

(4.) Catapulta for arrows, spears, or darts. Some of the ſpears, &c. thrown by theſe engines, are ſaid to have been 18 feet long, and to have been thrown with ſuch velocity as to take fire in their courſe. In *Fig.* 2. A B C D is the frame that holds the darts or arrows, which may be of different numbers, and placed in different directions. E F is a large and ſtrong iron ſpring, which is bent by a rope that goes over three pullies, I, K, L; and is drawn by one or ſeveral men; this rope may be faſtened to a pin at M. The rope, therefore, being ſet at liberty, the ſpring muſt ſtrike the darts with great violence, and ſend them, with ſurpriſing velocity, to a great diſtance. This inſtrument differs in ſome particulars from the deſcription we have of that of the ancients; principally in the throwing of ſeveral darts at the ſame time, one only being thrown by theirs.

(1.) * CATARACT. *n. ſ.* [καταράκτης.] A fall of water from on high; a ſhoot of water; a caſcade.—

> No ſooner he, with them of man and beaſt
> Select for life, ſhall in the ark be lodg'd,
> And ſhelter'd round; but all the *cataracts*
> Of heav'n ſet open, on the earth ſhall pour
> Rain, day and night. *Milton's Par. Loſt.*

(2.) Cataract, in hydrograpby, is occaſioned by a precipice in the channel of a river, cauſed by rocks or other obſtacles, ſtopping the courſe of the ſtream, from whence the water falls with a greater noiſe and impetuoſity. Such are the cataracts of the Nile, the Danube, Rhine, &c. In that of Niagara, the perpendicular fall of the water is 137 feet: and in that of Piſtill Rhaiadr, in North Wales, the fall of water is near 240 feet from the mountain to the lower pool. Strabo calls that a *cataract* which we call a Cascade; and what we call a *cataract*, the ancients uſually called Catadupa. Herminius has an expreſs diſſertation, *De admirandis mundi* Cataractis, *ſupra et ſubterraneis:* where he uſes the word in a new ſenſe; ſignifying, by cataract, any violent motion of the elements.

(3.) * Cataract. [In medicine.] A ſuffuſion of the eye, when little clouds, motes, and flies ſeem to float about in the air; when confirmed, the pupil of the eye is either wholly, or in part, covered, and ſhut up with a little thin ſkin, ſo that the light has no admittance. *Quincy.*—Saladine hath a yellow milk, which hath likewiſe much acrimony; for it cleanſeth the eyes; it is good alſo for *cataracts*. *Bacon's Natural Hiſtory.*

(4.) Cataract, (§ 2.) is otherwiſe defined, a diſorder of the humours of the eye, by which the pupil, that ought to appear tranſparent and black, looks opaque, blue, grey, brown, &c. whereby viſion is variouſly impeded, or totally deſtroyed. See Surgery.

CATARACTES, in ornithology, the trivial name of a ſpecies of Larus.

CATARIA, in botany, cat-mint. See Nepeta.

CATARO. See Cattaro.

(1.) * CATARRH. *n. ſ.* [καταῤῥέω, *defluo.*] A defluxion of a ſharp ſerum from the glands about the head and throat, generally occaſioned by a diminution of inſenſible perſpiration, or cold, wherein what ſhould paſs by the ſkin, oozes out upon thoſe glands, and occaſions irritations. The cauſes are, whatſoever occaſions too great a quantity of ſerum; whatſoever hinders the diſcharge by urine, and the pores of the ſkin. *Quincy.*—Neither was the body then ſubject to die by piece-meal, and languiſh under coughs, *catarrhs*, or conſumptions. *South.*

(2.) CATARRH. See MEDICINE, *Index.*

* CATARRHAL. } *adj.* [from *catarrh.*] Re-
* CATARRHOUS. } lating to a catarrh; proceeding from a catarrh.—The *catarrhal* fever requires evacuations. *Floyer.*—Old age attended with a glutinous, cold, *catarrhous*, leuco-phlegmatick conſtitution. *Arbuthnot on Diet.*

CATASARCA, the undermoſt altar cloth in the Greek church.

CATASCOPIUM, in antiquity, [from κατασκοπειν, to explore,] an exploratory veſſel, anſwering to the modern brigantine. *Cicero ad Atticum.* Lib. V. Ep. 11.

CATASTA, in antiquity; 1. a wooden ſcaffold, wherein ſlaves were exhibited for ſale, naked; 2. a place whereon criminals were executed.

CATASTASIS, in poetry, the 3d part of the ancient drama; being that wherein the intrigue or action, ſet forth in the epitaſis, is ſupported, carried on, and heightened, till it be ripe for the unravelling in the cataſtrophe. Scaliger defines it, the full growth of the fable, while things are at a ſtand in that confuſion to which the poet has brought them.

CATASTROMA, in ancient ſhips of war, a ſort of ſcaffold on the head and ſtern, whereon the ſoldiers were poſted.

(1.) * CATASTROPHE. *n. ſ.* [καταστροφη.] 1. The change or revolution, which produces the concluſion or final event of a dramatic piece.—Pat?—He comes like the *cataſtrophe* of the old comedy. *Shakeſ.*—That philoſopher declares for tragedies, whoſe *cataſtrophes* are unhappy, with relation to the principal characters. *Dennis.* 2. A final event; a concluſion generally unhappy.—Here was a mighty revolution, the moſt horrible and protentous *cataſtrophe* that nature ever yet ſaw; an elegant and habitable earth quite ſhattered. *Woodward.*

(2.) CATASTROPHE, in the ancient dramatic poetry, the 4th and laſt part, or that immediately ſucceeding the cataſtaſis: or, according to others, the 3d only; the whole drama being divided into protaſis, epitaſis, and cataſtrophe; or in the terms of Ariſtotle, prologue, epilogue, and exode. The cataſtrophe clears up every thing, and is the diſcovery or winding up of the plot. It has its peculiar place: for it ought entirely to be contained, not only in the laſt act, but in the very concluſion of it; and when the plot is finiſhed, the play ſhould be ſo alſo. The cataſtrophe ought to turn upon a ſingle point, or ſtart up on a ſudden. The great art is, that the clearing up of all difficulties may appear wonderful, and yet eaſy, ſimple, and natural. It is very prepoſterous to ſhow the cataſtrophe in the very title of the play. Mr Dryden thinks that a cataſtrophe reſulting from a mere change in the ſentiments and reſolutions of a perſon, without any other machinery, may be ſo managed as to be exceedingly beautiful. It is diſputed among the critics, whether the cataſtrophe ſhould always fall out favourably on the ſide of virtue or not. Ariſtotle prefers a ſhocking cataſtrophe to a happy one. The cataſtrophe is either ſimple or complex. The firſt is that in which there is no change in the ſtate of the principal perſons, nor any diſcovery or unravelling, the plot being only a mere paſſage out of agitation into quiet repoſe. In the ſecond, the principal perſons undergo a change of fortune.

CATATHUMPTON, a word uſed by way of ridicule or irony for a mighty ſtrong argument.

CATATYPOSIS, a figure in rhetoric, when one thing is done by the example of another.

CATAWESSY, or HUGHESBURG, a town of Pennſylvania, in Northumberland county, ſituated at the mouth of the Catawеſſy creek, on the E. branch of the Suſquehannah, 25 miles ENE. of Sunbury, and 100 NW. of Philadelphia.

CAT-BLOCK. See CAT-HEADS, § 3.

* CATCAL. *n. ſ.* [from *cat* and *call.*] A ſqueaking inſtrument, uſed in the playhouſe to condemn plays.—A young lady, at the theare, conceived a paſſion for a notorious rake that headed a party of *catcals*. *Spectator.*

(1.) * CATCH. *n. ſ.* [from the verb.] 1. Seizure; the act of ſeizing any thing that flies or hides.—

> Taught by his open eye,
> His eye, that ev'n did mark her trodden graſs,
> That ſhe would fain the *catch* of Strephon fly.
> *Sidney.*

2. Watch; the poſture of ſeizing.—Both of them lay upon the *catch* for a great action; it is no wonder, therefore, that they were often engaged on one ſubject. *Addiſon.* 3. An advantage taken; hold laid on, as in haſte.—All which nations are but ignorant *catches* of a few things, which are moſt obvious to men's obſervations. *Bacon.* 4. The act of taking quickly from another.—Several quires, placed one over againſt another, and taking the voice by *catches* anthem wiſe, give great pleaſure. *Bacon.* 5. A ſong ſung in ſucceſſion, where one *catches* it from another.—This is the tune of our *catch*, play'd by the picture of nobody. *Shak.*—

> The meat was ſerv'd, the bowls were crown'd,
> *Catches* were ſung, and healths went round. *Prior.*

6. The thing caught; profit; advantage.—Hector ſhall have a great *catch*, if he knock out your brains; he were as good crack a fuſty nut with no kernel. *Shak.* 7. A ſnatch; ſhort interval of action.—It has been writ by *catches*, with many intervals. *Locke.* 8. A taint; a ſlight contagion.—We retain a *catch* of thoſe pretty ſtories, and our awakened imagination ſmiles in the recollection. *Glanville.* 9. Any thing that catches and holds, as a hook. 10. A ſmall ſwift ſailing ſhip: often written *ketch.*

(2.) CATCH, in the muſical ſenſe of the word, (§ 1. *def.* 5.) a fugue in the uniſon, wherein, to humour ſome conceit in the words, the melody is broken, and the ſenſe interrupted in one part, and caught again or ſupported by another; as in Shakeſpeare's *Twelfth Night*, where there is a catch ſung by 3 perſons, in which the humour is, that each who ſings, calls and is called *knave* in turn. Mr Jackſon defines a catch, " a piece for 3 or more voices, one of which leads, and the others follow in the ſame notes. It muſt be ſo contrived, that reſts (which are made for that purpoſe) in the muſic of one line be filled up with a word or two from another line; theſe form a croſs purpoſe, or catch, from whence the name.”

(1.) * *To* Catch. *v. a.* preter. *catched*, or *caught*; I have *catched* or *caught*. [*ketſen*, Dutch.] 1. To lay hold on with the hand; intimating the ſuddenneſs of the action.—And when he roſe againſt me, I *caught* him by his beard, and ſmote him, and ſlew him. 1 *Sam.* xvii. 35. 2. To ſtop any thing flying; to receive any thing in the paſſage.—

Others, to *catch* the breeze of breathing air,
To Tuſculum or Algido repair. *Addiſon.*

3. To ſeize any thing by purſuit.—I ſaw him run after a gilded butterfly, and, when he *caught* it, he let it it go again; and after it again; and over and over he comes, and up again; and *caught* it again. *Shak.* 4. To ſtop any thing falling.—A ſhepherd diverted himſelf with toſſing up eggs, and *catching* them again. *Spectator.* 5. To enſnare; to intangle in a ſnare; to take or hold in a trap.—And they ſent unto him certain of the Phariſees and of the Herodians, to *catch* him in his words. *Mark*, xii. 13.—Theſe artificial methods of reaſoning are more adapted to *catch* and entangle the mind, than to inſtruct and inform the underſtanding. *Locke.* 6. To receive ſuddenly.—

But ſtopp'd for fear, thus violently driv'n,
The ſparks ſhould *catch* his axletree of heav'n. *Dryden.*

7. To faſten ſuddenly upon; to ſeize.—The mule went under the thick boughs of a great oak, and his head *caught* hold of the oak. 2 *Sam.* xviii. 19.—Would they, like Benhadad's embaſſadours, *catch* hold of every amicable expreſſion? *Decay of Piety.* 8. To ſeize unexpectedly.—To *catch* ſomething out of his mouth, that they might accuſe him. *Luke* xi. 54. 9. To ſeize eagerly.—They have *caught* up every thing greedily, with that buſy minute curioſity, and unſatisfactory inquiſitiveneſs, which Seneca calls the diſeaſe of the Greeks. *Pope.* 10. To pleaſe; to ſeize the affections; to charm.—

For I am young, a novice in the trade,
The food of love, unpractis'd to perſuade,
And wanting the ſoothing arts that *catch* the fair,
But, caught myſelf, lie ſtruggling in the ſnare. *Dryden.*

11. To receive any contagion or diſeaſe.—

I cannot name the diſeaſe, and it is *caught*
Of you that yet are well *Shak.*

—The ſofteſt of our Britiſh ladies expoſe their necks and arms to the open air, which the men could not do, without *catching* cold, for want of being accuſtomed to it. *Addiſon.* 12. *To catch at.* To endeavour ſuddenly to lay hold on.—Make them *catch at* all opportunities of ſubverting the ſtate. *Addiſon.*

(2.) * *To* Catch. *v. n.* 1. To be contagious; to ſpread infection, or miſchief.—Conſidering it with all its malignity and *catching* nature, it may be enumerated with the worſt of epidemicks. *Harvey.*—

Does the ſedition *catch* from man to man,
And run among the ranks? *Addiſon.*

2. To lay hold ſuddenly: as, the hook *catches.*—

When the yellow hair in flame ſhould fall,
The *catching* fire might burn the golden cawl. *Dryden.*

CATCHASIDE, a village in Northumberland, 4 miles SE. of Elleſdon.

CATCHBORN, a town near Morpeth.

* CATCHER. *n. ſ.* [from *catch.*] 1. He that catches. 2. That in which any thing is caught.—Scallops will move ſo ſtrongly, as oftentimes to leap out of the *catcher* wherein they are caught. *Grew.*

(1.) * CATCHFLY. *n. ſ.* [from *catch* and *fly.*] A plant; a ſpecies of *campion;* which ſee.

(2.) Catchfly. See Lychnis and Silene.

CATCH-LAND, land, particularly in Norfolk, with reſpect to which it is not certainly known to what pariſh it belongs; ſo that the perſon who firſt gets the tythes there, enjoys it for that year, by right of pre-occupation.

* CATCHPOLL. *n. ſ.* [from *catch* and *poll.*] A ſerjeant; a bum-bailiff.—*Catchpoll*, though now it be uſed as a word of contempt, yet, in ancient times, it ſeems to have been uſed without reproach, or ſuch as we now call ſerjeants of the mace, or any other that uſes to arreſt men upon any cauſe. *Cowel.*—They call all temporal buſineſſes underſheriffries, as if they were but matters for underſheriffs and *catchpolls*; though many times thoſe underſheriffries do more good than their high ſpeculations. *Bacon.*—

Another monſter,
Sullen of aſpect. by the vulgar call'd
A *catchpoll*, whoſe polluted hands the gods,
With force incredible and magick charms,
Erſt have endu'd, if he his ample palm
Should haply on ill-fated ſhoulder lay
Of debtor. *Philips.*

* CATCHWORD. *n. ſ.* [from *catch* and *word.* With printers.] The word at the corner of the page under the laſt line, which is repeated at the top of the next page.

(1.) CATCOMB, a town near Portſmouth.

(2.) Catcomb, near Murlinch, Somerſetſhire.

CAT-DEAN, near Beddick, in Durham.

(1.) * CATE. *n. ſ.* Food; ſomething to be eaten. This is ſcarcely read in the ſingular. See Cates.—

We'll ſee what *cates* you have,
For ſoldiers ſtomachs always ſerve them well. *Shak.*

(2.) Cate, in botany. See Lycium.

CATEAU. See Chateau Cambresis.

CATECHESIS, an inſtruction given any perſon in the firſt rudiments of an art or ſcience; but more particularly of the Chriſtian religion. In the ancient church, it was an inſtruction given *viva voce*, either to children or adult heathens, preparatory to their receiving baptiſm.

CATECHETIC, or (1.) CATECHETICAL, } ſomething that relates to oral inſtruction in the rudiments of Chriſtianity.—Catechetic ſchools were buildings appointed for the office of the catechiſt. See Catechumenum. Such was that in which Origen and many other famous men read catechetical lectures at Alexandria.

(2.) * Catechetical. *adj.* [from κατηχέω.] Conſiſting of queſtions and anſwers.—Socrates introduced a *catechetical* method of arguing; he would aſk his adverſary queſtion upon queſtion, till he convinced him, out of his own mouth, that his opinions were wrong. *Addiſon.*

* CATECHETICALLY. *adv.* [from *catecheti-cal.*] In the way of queſtion and anſwer.

* *To* CATECHISE. *v. a.* [κατηχιω.] 1. To inſtruct by aſking queſtions, and correcting the anſwers.—I will *catechiſe* the world for him; that is make queſtions, and bid them anſwer. *Shak.* 2. To queſtion; to interrogate; to examine; to try by interrogatories.—

> When then I ſuck my teeth, and *catechiſe*
> My picked man of countries. *Shak.*

* CATECHISER. *n. ſ.* [from *To catechiſe.*] One who catechizes.

(1.) * CATECHISM. *n. ſ.* [from κατηχιζω.] A form of inſtruction by means of queſtions and anſwers, concerning religion.—Ways of teaching there have been ſundry always uſual in God's church; for the firſt introduction of youth to the knowledge of God, the Jews even to this day have their *catechiſms. Hooker.*—He had no *catechiſm* but the creation, needed no ſtudy but reflection, and read no book but the volume of the world. *South.*

(2.) Catechism, in its primary ſenſe, ſignifies an inſtruction in the principles of the Chriſtian religion, delivered *viva voce,* ſo as to require frequent repetitions, from the diſciple or hearer, of what has been ſaid. Anciently the candidates for baptiſm were only inſtructed in the ſecrets of their religion by tradition, without writing.

(1.) * CATECHIST. *n. ſ.* [κατηχιστης.] One whoſe charge is to inſtruct by queſtions, or to queſtion the uninſtructed concerning religion.—None of years and knowledge was admitted, who had not been inſtructed by the *catechiſt* in this foundation, which the *catechiſt* received from the biſhop. *Hammond's Fundamentals.*

(2.) Catechist particularly denotes a perſon appointed to inſtruct thoſe intended for baptiſm, by word of mouth, in the fundamental articles of Chriſtianity. The catechiſts of the ancient churches were miniſters uſually diſtinct from the biſhops and preſbyters, and had their *catechumena* or auditories apart. But they did not conſtitute any diſtinct order of the clergy, being choſen out of any order. The biſhop himſelf ſometimes performed the office; at other times, preſbyters, readers, or deacons. Origen was made catechiſt at Alexandria when only 18 years of age, and conſequently incapable of the deaconſhip.

(1.) CATECHU, in botany. See Mimosa.

(2.) Catechu, in the materia medica, the name of a troche, conſiſting of Japan earth and gum arabic, each 2 oz. and of ſugar of roſes 16 oz. beat together with a little water. It is recommended as a mild reſtringent, &c.

(1.) * CATECHUMEN. *n. ſ.* [κατηχουμενος.] One who is yet in the firſt rudiments of Chriſtianity; the loweſt order of Chriſtians in the primitive church.—The prayers of the church did not begin in St Auſtin's time, till the *catechumens* were diſmiſſed. *Stillingfleet.*

(2.) Catechumens, in church hiſtory, had a title to the common name of Chriſtians, being a degree above pagans and heretics, though not conſummated by baptiſm. They were admitted to this ſtate by the impoſition of hands, and the ſign of the croſs. The children of believing parents were admitted catechumens, as ſoon as they were capable of inſtruction; but at what age thoſe of heathen parents were admitted, is not ſo clear. As to the time of their continuance in this ſtate, there were no general rules; but the practice varied according to the difference of times and places, and the proficiency of the catechumens. There were 4 degrees of catechumens; the firſt were thoſe inſtructed privately without the church, and kept for ſome time from the privilege of entering it, to make them the more deſirous of it. The next were the AUDIENTES, ſo called from their being admitted to hear ſermons, and the ſcriptures read in the church, but not allowed to partake of the prayers. The 3d were the GENUFLECTENTES, ſo called becauſe they received impoſition of hands kneeling. The 4th were the COMPETENTES & ELECTI, denoting the immediate candidates for baptiſm, appointed to be baptiſed at next feſtival. Theſe, after examination, were exerciſed for 20 days together, and were obliged to faſting and confeſſion: ſome days before baptiſm they were veiled; and it was cuſtomary to touch their ears, ſaying, *Ephatha,* i. e. Be opened; alſo to anoint their eyes with clay, in pretence of imitating our Saviour's practice.

* CATECHUMENICAL. *adj.* [from *catechumen.*] Belonging to the catechumens. *Dict.*

CATECHUMENUM; 1. A name given to an upper gallery in the churches: 2. A ſort of ſchool-houſe near the church, where the catechumens met to receive the inſtructions of the catechiſts.

CATEE. See Cachoo.

CATEGAT, or } the paſſage from the German
CATEGATE, } Ocean into the Sound, or the entrance into the Baltic; lying between Denmark, Jutland, Sweden, and Norway; and comprehending ſeveral iſlands.

CATEGOREMA, [from κατηγορεω, *I declare,*] a noun ſubſtantive, ſo abſolute and independent, that it may ſtand at the head of a claſs; as, *a man, an animal, a planet,* &c. See Category.

CATEGORIÆ, [κατηγορια.] in literary hiſtory, a work of Ariſtotle's. See Category, § 2.

CATEGORIARES, a miniſter in the Greek church, whoſe buſineſs is to proclaim the feaſt days; take care of the lights, &c.

(1.) * CATEGORICAL. *adj.* [from *category.*] Abſolute; adequate; poſitive; equal to the thing to be expreſſed.—The king's commiſſioners deſired to know, whether the parliament's commiſſioners did believe that biſhops were unlawful? They could never obtain a *categorical* anſwer. *Clarendon.*—A ſingle propoſition, which is alſo *categorical,* may be divided again into ſimple and complex. *Watt's Logick.*

(2.) Categorical, is alſo applied to things ranged under a category.

* CATEGORICALLY. *adv.* [from *categorical.*] 1. Directly; expreſsly. 2. Poſitively; plainly.—I dare affirm, and that *categorically,* in all parts wherever trade is great, and continues ſo, that trade muſt be nationally profitable. *Child.*

CATEGORUMENUM, denotes the PREDICATE, or that part of a propoſition, which is affirmed of the ſubject. Some miſtakenly call this CATEGOREMA.

(1.) * CATEGORY. *n. ſ.* [κατηγορια.] A claſs; a rank; an order of ideas; a predicament.—The abſolute infinitude, in a manner, quite changes the nature of beings, and exalts them into a different *category. Cheyne.*

(2.) CATEGORY, in logic, a ſeries of all the attributes contained under any genus. The ancient philoſophers diſtributed all the objects of our thoughts and ideas into certain *genera* or claſſes, not ſo much, ſay they, to learn what they do not know, as to communicate a diſtinct notion of what they do know. Theſe claſſes the Greeks called *categories*, and the Latins *predicaments*. Ariſtotle made ten categories, comprehending under the firſt all ſubſtantives; and all accidents under the 9 laſt, viz. quantity, quality, relation, action, paſſion, time, place, ſituation, and habit, which are uſually expreſſed by the following technical diſtich:

Arbor, ſex, ſervos, ardore, refrigerat, uſtos,
Rure cras ſtabo, nec tunicatus ero.

CATEIA, in ancient writers, a kind of javelin, uſed among the ancient Gauls and Germans, made of heavy matter, and therefore not fitted to fly far, but doing great execution where it did reach; and having an apparatus by which the perſon who threw it might draw it back again. It is mentioned by Virgil, Æn. lib. vii. ver. 741.

CATEK. See BENGAL, N° I. § 8.

CATENARIA. See CATENARY.

* CATENARIAN. *adv.* [from *catena*, Lat.] Relating to a chain; reſembling a chain.—In geometry, the *catenarian* curve is formed by a rope or chain hanging freely between two points of ſuſpenſion. *Harris.*—The back is bent after the manner of the *catenarian* curve, by which it obtains that curvature that is ſafeſt for the included marrow. *Cheyne's Philoſophical Principles.*

CATENARY, in the higher geometry, is a curve line formed by a cord hanging freely from two points of ſuſpenſion, whether the points be horizontal or not. It is otherwiſe called the ELASTIC CURVE. The nature of this curve was ſought after by Galileo, who thought it was the ſame with the parabola; but though Jungius detected this miſtake, its true nature was not diſcovered till 1691, in conſequence of M. John Bernoulli having publiſhed it as a problem in the *Acta Eruditorum*, to the mathematicians in Europe. In 1697, Dr D. Gregory publiſhed an inveſtigation of its properties, which before had been diſcovered by Bernoulli and Leibnitz. This curve is of the mechanical kind, and cannot be expreſſed by a finite algebraical equation in ſimple terms of its abciſs and ordinate. The inveſtigation of the nature and chief properties of this curve will be found under the article FLUXIONS.

* *To* CATENATE. *v. a.* [from *catena*, Lat.] To chain. *Dict.*

* CATENATION. *n. ſ.* [from *catena*, Lat.] Link; regular connexion.—This *catenation*, or conſerving union, whenever his pleaſure ſhall divide, let go, or ſeparate, they ſhall fall from their exiſtence. *Brown's Vulgar Errours.*

(1.) * CATER. *n. ſ.* [from the verb.] Provider; collector of proviſions, or victuals: miſprinted perhaps for *Caterer.*—The oyſters dregged in this Lyner, find a welcomer acceptance, where the taſte is *cater* for the ſtomach, than thoſe of the Tamar. *Carew's Survey of Cornwall.*

(2.) * CATER. *n. ſ.* [*quatre*, Fr.] The four of cards and dice.

* *To* CATER. *v. n.* [from *cater.*] To provide food; to buy in victuals.—

He that doth the ravens feed,
Yea providently *caters* for the ſparrow,
Be comfort to my age. *Shakeſpeare.*

* CATER-COUSIN, *n. ſ.* A corruption of *quatre-couſin*, from the ridiculouſneſs of calling couſin or relation to ſo remote a degree.—His maſter and he, ſaving your worſhip's reverence, are ſcarce *cater couſins. Shakeſpeare.*

* CATERER. *n. ſ.* [from *cater.*] One employed to ſelect and buy in proviſions for the family; the providore or purveyor.—

Let no ſcent offenſive the chamber infeſt;
Let fancy, not coſt, prepare all our diſhes;
Let the *caterer* mind the taſte of each gueſt,
And the cook in his dreſſing comply with their wiſhes. *Ben Jonſon.*

* CATERESS. *n. ſ.* [from *cater.*] A woman employed to cater, or provide victuals.—

Impoſtor! do not charge innocent nature,
As if ſhe would her children ſhould be riotous
With her abundance? ſhe, good *catereſs*,
Means her proviſion only to the good. *Milton.*

CATERHAM, a village in Surry, N. of Bleechingley.

CATERLAUGH, in Leinſter, Ireland.

CATERN, in Somerſetſhire, NE. of Bath.

(1.) * CATERPILLAR. *n. ſ.* [This word *Skinner* and *Minſhew* are inclined to derive from *chatte peluſe*, a weaſel; it ſeems eaſily deducible from *cates*, food, and *piller*, Fr. to rob; the animal that eats up the fruits of the earth.] 1. A worm which, when it gets wings, is ſuſtained by leaves and fruits.—The *caterpillar* breedeth of dew and leaves; for we ſee infinite *caterpillars* breed upon trees and hedges, by which the leaves of the trees or hedges are conſumed. *Bacon.*—Auſter is drawn with a pot pouring forth water, with which deſcend graſshoppers, *caterpillars*, and creatures bred by moiſture. *Peacham on Drawing.* 2. Any thing voracious and uſeleſs.

(2.) * CATERPILLAR. *n. ſ.* [*ſcorpoides*, Lat.] The name of a plant. *Miller.*

(3.) CATERPILLAR, in botany. See SCORPIURUS.

(4.) CATERPILLAR, in zoology, is the name of all winged inſects, while in their reptile or worm ſtate. See ERUCA.

(5.) CATERPILLARS, METHODS OF DESTROYING. To deſtroy theſe inſects on trees, take a chafing diſh with lighted charcoal, and placing it under the branches that are loaded with caterpillars, throw ſome brimſtone upon the coals. The vapour of the ſulphur, which is mortal to theſe inſects, will not only deſtroy all that are on the tree, but prevent it from being infeſted with them afterwards. A pound of ſulphur will clear as many trees as grow on ſeveral acres. This method has been ſucceſsfully tried in France. In the *Journal Oeconomique*, the following is ſaid to be infallible againſt the caterpillars feeding on cabbage, and perhaps may be equally ſerviceable againſt thoſe that infeſt other vegetables. Sow with hemp all the borders of the ground where the cabbage is to be planted; and, although the neighbourhood is infeſted with caterpillars, the ſpace incloſed by the hemp will be free, as not one of the vermin will approach it.

CATERPILLAR-EATERS, a ſpecies of worms bred in the body of the caterpillar, and which eat its fleſh. Theſe are produced by a certain kind of fly that lodges her eggs in the body of this animal, and they, after their proper changes, become flies like their parents. Mr Reaumur has given us, in his *Hiſtory of Inſects*, ſome very curious particulars reſpecting theſe little worms. Each of them ſpins itſelf a very beautiful caſe, of a cylindric figure of a very ſtrong ſort of ſilk; in which this animal ſpends its ſtate of chryſalis; and they have a mark by which they may be known from all other animal productions of this kind, which is, that they have always a broad ſtripe or band ſurrounding their middle, which is black when the reſt of the caſe is white, and white when that is black. Mr Reaumur has had the patience to find out the reaſon of this ſingularity. The whole ſhell is ſpun of a ſilk produced out of the creature's body; this at firſt runs all white, and towards the end of the ſpinning turns black. The outſide of the caſe muſt neceſſarily be formed firſt, as the creature works from within: conſequently this is truly white all over, but it is tranſparent, and ſhows the laſt ſpun or black ſilk through it. It might be ſuppoſed that the whole inſide of the ſhell ſhould be black; but this is not the caſe: the whole is faſhioned before this black ſilk comes; and this is employed by the creature, not to line the whole, but to fortify certain parts only; and therefore is all applied either to the middle or to the two ends omitting the middle, or a blackneſs at both ends, leaving the white in the middle to appear. It is not uncommon to find a ſort of ſmall caſes, in garden walks, which move of themſelves; when theſe are opened, they are found to contain a ſmall living worm. This is one of the ſpecies of theſe caterpillar-eaters; which, as ſoon as it comes out of the body of that animal, ſpins itſelf a caſe for its transformation, and lives in it without food till that change comes on; when it becomes a fly like that to which it owed its birth.

CATERTHUN. See CATTERTHUN.

CATERVA, or } in ancient military writers,
CATERVARIUS, } a term uſed in ſpeaking of the Gauliſh or Celtiberian armies, denoting a body of 6000 armed men. The word is alſo frequently uſed for a party of ſoldiers in diſorder.

* *To* CATERWAUL. *v. n.* [from *cat.*] 1. To make a noiſe as cats in rutting time. 2. To make any offenſive or odious noiſe.—What a *caterwaling* do you keep here? If my lady has not called up her ſteward Malvolio, and bid him turn you out of doors, never truſt me. *Shak. Twel. Night.*

* CATES. *n. ſ.* [of uncertain etymology; *Skinner* imagines it may be corrupted from *delicate;* which is not likely, becauſe *Junius* obſerves, that the Dutch have *kater* in the ſame ſenſe with our *cater*. It has no *ſingular*.] Viands; food; diſh of meat: generally employed to ſignify nice and luxurious food.—

> They by th' alluring odour drawn, in haſte
> Fly to the dulcet *cates*, and crouding ſip
> Their palatable bane. *Philips.*
> With coſtly *cates* ſhe ſtain'd her frugal board,
> Then with ill gotton wealth ſhe bought a lord.
> *Arbuthnot.*

CATESBÆA, the LILY-THORN: A genus of the monogynia order, belonging to the tetrandria claſs of plants; and in the natural method ranking under the 28th order, *Luridæ*. The corolla is monopetalous, funnel-ſhaped, very long above the receptacle of the fruit; the ſtamina are within its throat; the fruit a polyſpermous berry. There is only one ſpecies, viz. the

CATESBÆA SPINOSA, a native of the iſland of Providence, diſcovered by Mr Cateſby, who gathered the ſeeds, and brought them to England. It riſes to the height of 10 or 12 feet, and is covered with a pale ruſſet bark; the branches come out alternately, and are garniſhed with ſmall leaves reſembling thoſe of the box tree, coming out in cluſters all round the branches at certain diſtances; the flowers hang downward, and come out from the ſides of the branches: they are tubulous, and near 6 inches long, very narrow at their baſe, but widening upwards towards the top, where the plant is divided into 5 parts, which ſpread open, and are reflexed backward. They are of a dull yellow colour. This plant is propagated by ſeeds which muſt be procured from the country where it grows. The ſeeds muſt be ſown on a hot-bed, and are to be treated in the ſame manner as other tender exotics.

CASTESBY, a village in Northamptonſhire, NW. of Daventry.

CATESMORE, near Stamford, Lincolnſhire.

CAT-FALL. See CAT-HEAD, § 3.

CATFIELD, a town near Hickling, Norfolk.

(1.) * CATFISH. *n. ſ.* The name of a ſea fiſh in the Weſt-Indies; ſo called from its round head and large glaring eyes, by which they are diſcovered in hollow rocks. *Philips.*

(2.) CAT-FISH, in ichthyology. See SQUALUS.

(1.) CAT-GUT, a denomination given to ſmall ſtrings for fiddles, and other inſtruments, made of the inteſtines of ſheep or lambs, dried and twiſted together, either ſingly, or ſeveral together. Theſe are ſometimes coloured red, ſometimes blue, but are commonly left whitiſh or browniſh, the natural colour of the gut. They are alſo uſed by watch-makers, cutlers, turners, and other artificers. Great quantities are imported into England, and other countries, from Lyons and Italy.

(2.) CAT-GUT, a kind of canvas for ladies work.

CATH, a town of Aſia, in Kowareſm.

CATHÆRETICS, in pharmacy, medicines of a cauſtic nature, ſerving to eat off proud fleſh.

CATHAI, the name given by the Europeans to China, on their firſt diſcovery of it.

CATHARI, or } in eccleſiaſtical writers, an-
CATHARIANS, } cient Chriſtians, who made profeſſion of greater purity in diſcipline and ſanctity of life than others. The title was chiefly given to the ſect of NOVATIANS.

(1.) CATHARINE, ST, a virgin of Alexandria, celebrated for her learning, as well as piety, who is ſaid to have ſuffered martyrdom, under the emperor Maximin, about A. D. 236. Her body being afterwards diſcovered on Mount Sinai, gave riſe to the order of Knights of St Catharine. See § 5.

(2.) Catharine, St, another famous ſaint of the church of Rome, born at Sienna, in 1347, who is better entitled to a place in an Encyclopædia, as an authoreſs, than either as a ſaint, propheteſs, or miracle-worker, though ſhe is highly celebrated in all theſe characters. Indeed the monks ſeem to have exhauſted not only the powers of credulity, but even of invention itſelf, by the ſtories they tell us of this lady. They not only relate, that ſhe was ſo early devoted to piety as to become a nun of the order of St Dominic at 7 years of age, and that ſhe ſaw numberleſs viſions, and wrought multitudes of miracles before ſhe was grown up to be a woman, but that ſhe converſed face to face with Jeſus Chriſt, and was actually *married* to him in form! With ſuch celeſtial influence we need not wonder, that ſhe was able to bring about a reconciliation between Pope Gregory XI. and the people of Avignon, in 1376, even after he had excommunicated them; or that in 1377, ſhe ſhould have prevailed on him to re-eſtabliſh the pontifical ſeat at Rome, 70 years after Clement V. had transferred it to France. She died April 30, 1380, aged 33; and was canonized by Pius II. in 1461. Her works are, 1. *Revelations;* printed at Cologne, 1553: 2. *Dialogues on the Providence of God;* in Latin: 3. *An Oration upon the Annunciation:* both at Ingolſtadt, 1385: and, laſtly, 364 *Letters to Popes, Cardinals, Kings, and Princes;* Venice, 1506.

(3.) Catharine, St, a third ſaint of the Romiſh church, canonized by Pope Clement VII. She was born at Bologna, in 1413, and admitted a nun at Ferrara 1432. She was afterwards abbeſs of a convent at Bologna, where ſhe died in 1463. She wrote a book of *Revelations,* and ſeveral pieces in Latin and Italian.

(4.) Catharine, St, fraternity of, at Sienna, a religious ſociety inſtituted in that city, in honour of St Catharine, (ſee N° 2.) whoſe wedding ring, ſaid to have been preſented to her by our Saviour, is ſtill preſerved as a valuable relic. This fraternity yearly endows a certain number of deſtitute virgins, and has the privilege of redeeming annually two criminals condemned for murder, and the ſame number of debtors, by paying their debts.

(5.) Catharine, St, of M. Sinai, knights of, an ancient military order, erected for the aſſiſtance and protection of the numerous pilgrims who went to pay their devotions to the body of St Catharine, on mount Sinai. See N° 1. Travelling being very dangerous, by reaſon of the Arabs, an order of knighthood was erected in 1063, on the model of that of the holy ſepulchre, and under the patronage of St Catharine: the knights of which obliged themſelves by oath to guard the body of the ſaint, keep the roads ſecure, obſerve the rule of St Baſil, and obey their grand maſter. Their habit was white, and on it were repreſented the inſtruments of martyrdom whereby the ſaint had ſuffered; viz. a half wheel armed with ſpikes, and traverſed with a ſword ſtained with blood.

(6.) Catharine, St, order of, an order for ladies of the firſt quality in the Ruſſian court, inſtituted in 1714, by Catherine wife of Peter the Great, in memory of his ſignal eſcape from the Turks in 1711. The enſigns of this order are a red croſs, ſupported by a figure of St Catharine, and faſtened to a ſcarlet ſtring edged with ſilver, on which are inſcribed the name of St Catharine, and the motto *Pro fide & patria.*

CATHARINENSLAF. See Catherinenslaf.

CATHARMA, in antiquity, a ſacrifice generally of ſome criminal, in expiation for the plague.

* CATHARPINGS. *n.ſ.* Small ropes in a ſhip. running in little blocks from one ſide of the ſhrouds to the other, near the decks; they belong only to the main ſhrouds; and their uſe is to force the ſhrouds tight, for the eaſe and ſafety of the maſts, when the ſhip rolls. *Harris.*

* CATHARTICALNESS. *n.ſ.* [from *cathartical.*] Purging quality.

(1.) * CATHARTICK. Cathartical. *adj.* [καθαρτικος.] Purging medicines. The vermicular or periſtaltick motion of the guts continually helps on their contents, from the pylorus to the rectum; and every irritation either quickens that motion in its natural order, or occaſions ſome little inverſions in it. In both, what but ſlightly adheres to the coats will be looſened, and they will be more agitated, and thus rendered more fluid. By this only it is manifeſt, how a *cathartic* haſtens and increaſes the diſcharges by ſtool; but where the force of the ſtimulus is great, all the appendages of the bowels, and all the viſcera in the abdomen, will be twiched; by which a great deal will be drained back into the inteſtines, and made a part of what they diſcharge. *Quincy.*—Quickſilver precipitated either with gold, or without addition, into a powder, is wont to be ſtrongly enough *cathartical,* though the chymiſts have not proved, that either gold or mercury hath any ſalt, much leſs any that is purgative. *Boyle's Sceptical Chymiſtry.*—Luſtrations and *cathartichs* of the mind were ſought for, and all endeavours uſed to calm and regulate the fury of the paſſions. *Dec. of Piety.*—Plato has called mathematical demonſtrations the *cathartichs* or purgatives of the ſoul. *Addiſon.*

(2.) Cathartics. See Materia medica.

(1.) CATHCART, an ancient pariſh of Scotland, in the counties of Renfrew and Lanark, but chiefly in the former; ſo named from the river Cart, which runs through it. It is 4 miles long and 2 broad; containing above 3000 acres, almoſt wholly arable. The ſoil is various, but fertile; and the crops of wheat, oats, and potatoes very abundant. Weaving, bleaching, and paper and ſnuff manufactures are carried on. The lime quarries employ 16 men, and afford 6000 carts of burnt lime annually. The population, in 1791, ſtated by the rev. Mr Dow, in his report to Sir J. Sinclair, was 697, and had increaſed 198 ſince 1755.

(2.) Cathcart Castle, the ancient ſeat of the earls of Cathcart, in the above pariſh, (N° 1.) was formery a very ſtrong ſquare building; being ſituated upon a very commanding ſituation with two of its ſides completely defended by the Cart; to which there is a perpendicular deſcent of a tremendous height; and the acceſs to the other ſide being very ſteep. It was inhabited within theſe 60 years, but is now a ruin.

(1.) * CATHEAD. *n.ſ.* A kind of foſſil.—The nodules with leaves in them, called *catheads*, ſeem to conſiſt of a ſort of iron ſtone, not unlike that which is found in the rocks near Whitehaven in Cumberland, where they call them catſcaups. *Woodward on Foſſils.*

(2.)* CATHEAD. *n.ſ.* [In a ſhip.] A piece of timber with two ſhivers at one end, having a rope and a block, to which is faſtened a great iron hook, to trice up the anchor from the hawſe to the top of the forecaſtle. *Sea Dict.*

(3.) CAT-HEADS, two ſtrong ſhort beams of timber, which project almoſt horizontally over the ſhip's bows on each ſide of the bow-ſprit; being like two radii which extend from a centre taken in the direction of the bow-ſprit. That part of the cat-head which reſts upon the forecaſtle, is ſecurely bolted to the beams: the other part projects like a crane as above deſcribed, and carries in its extremity 2 or 3 ſmall wheels or *ſheaves* of braſs or ſtrong wood, about which a rope called the CAT-FALL paſſes, and communicates with the CAT-BLOCK, which alſo contains 3 ſheaves. The machine formed by this combination of pullies is called the CAT, which ſerves to pull the anchor up to the cat-head, without tearing the ſhip's ſides with its flukes. The cat-head alſo ſerves to ſuſpend the anchor clear of the bow, when it is neceſſary to let it go: it is ſupported by a ſort of knee, which is generally ornamented with ſculpture. See *Plate* LX. *fig.* 7. The cat-block is filled with a large and ſtrong hood, which catches the ring of the anchor when it is to be drawn up.

CATHECU, in botany. See ARECA, N° 1.

CATHEDRA, [Καθέδρα, Gr. a chair,] is uſed for, 1. a profeſſor's chair; 2. a preacher's pulpit; and 3. a biſhop's ſee, or throne, in a church.

(1.) * CATHEDRAL. *adj.* [from *cathedra*, Lat. a chair of authority; an epiſcopal ſee.] 1. Epiſcopal; containing the ſee of a biſhop.—A *cathedral* church is that wherein there are two or more perſons, with a biſhop at the head of them, that do make, as it were, one body politick. *Ayliffe.* 2. Belonging to an epiſcopal church. His conſtant and regular aſſiſting at the *cathedral* ſervice was never interrupted by the ſharpneſs of weather. *Locke.* 3. In low phraſe, antique; venerable; old. This ſeems to be the meaning in the following lines.—

Here aged trees *cathedral* walks compoſe,
And mount the hill in venerable rows;
There the green infants in their beds are laid.
Pope.

(2.) * CATHEDRAL. *n.ſ.* The head church of a dioceſe.—There is nothing in Leghorn ſo extraordinary as the *cathedral*, which a man may view with pleaſure, after he has ſeen St Peter's. *Addiſ.*

(3.) CATHEDRAL, § 2. See BISHOP, and CHURCH. The name ſeems to have taken its riſe from the manner of ſitting in the ancient churches, or aſſemblies of primitive Chriſtians: In theſe, the PRESBYTERIUM; at their head was the biſhop who held the place of chairman, CATHEDRALIS, or CATHEDRATICUS; and the preſbyters, who ſat on either ſide alſo called by the ancient fathers, *Aſſeſſores Epiſcoporum.* The epiſcopal authority did not reſide in the biſhop alone; but in all the preſbyters. whereof the biſhop was preſident. A cathedral, therefore, originally was different from what it is now; the Chriſtians, till the time of Conſtantine, having no liberty to build any temple: by their churches they only meant their aſſembles; and by cathedrals, nothing more than conſiſtories.

CATHEDRATIC DOCTOR, a title given to a profeſſor in ſome of the univerſities in Spain.

CATHEDRATICUM, an annual tax of two ſhillings. anciently paid by the inferior clergy, to their biſhop when he viſited his dioceſe.

(1.) CATHERINE I. EMPRESS OF RUSSIA, a woman whoſe extraordinary riſe from the loweſt to the higheſt rank in life merits a particular relation. She was the natural daughter of a country girl; and was born at Ringen, a ſmall village in Livonia. The year of her birth is uncertain; but from her own account, ſhe was born 5th April 1687. Her original name was Martha, which ſhe changed for Catherine when ſhe embraced the Greek religion. Count Roſen, a lieutenant-colonel in the Swediſh ſervice, the proprietor of the village, ſupported, according to the cuſtom of the county, both the mother and the child; and was ſuppoſed by many to have been her father. She loſt her mother when ſhe was only 3 years old; and, as count Roſen died about the ſame time, ſhe was left in ſo deſtitute a ſituation, that the pariſh-clerk of the village took her into his houſe. Soon afterwards Gluck, Lutheran miniſter of Marienburgh, happening, to ſee the orphan took her under his protection, brought her up in his family, and employed her in attending his children. In 1701, and about the 14th year of her age, ſhe eſpouſed a dragoon of the Swediſh garriſon of Marienburgh: who, according to ſome lived only 8 days with her, while others affirm, that on the morning of the nuptials, he being ſent with a detachment for Riga, the marriage was never conſummated. This much is certain, that the dragoon was abſent when Marienburgh ſurrendered to the Ruſſians; and Catherine never ſaw him more. General Baur, upon the taking of Marienburgh, ſaw Catherine among the priſoners; and, being ſmitten with her beauty, took her to his houſe, where ſhe ſuperintended his domeſtic affairs, and was ſuppoſed to be his miſtreſs. Soon afterwards ſhe was removed into the family of prince Menzikof, who was no leſs ſtruck with her charms. With him ſhe lived until 1704; when, in the 17th year of her age, ſhe became the miſtreſs of Peter the Great, and won ſo much upon his affections, that he eſpouſed her on the 29th of May 1711. The ceremony was ſecretly performed at Jawerof in Poland, in the preſence of General Bruce; and on the 20th Feb. 1712, it was publicly ſolemnized at Peterſburg. Catherine, by the moſt unwearied aſſiduity and unremitted attention, by the ſoftneſs and complacency of her diſpoſition, but above all by an extraordinary livelineſs and gaiety of temper, acquired a wonderful aſcendency over the mind of Peter. The latter was ſubject to occaſional horrors, which at times rendered him gloomy and ſuſpicious, and raiſed his paſſions to ſuch an height as to produce a temporary madneſs. In theſe dreadful moments Catherine was the only perſon who durſt venture to approach him; and ſuch was the faſcination ſhe had acquired over him, that her preſence had an inſtantaneous effect, and the firſt ſound of her voice compoſed his mind and calmed his agonies. From theſe circumſtances ſhe ſeemed neceſſary, not only to his comfort, but even to his exiſtence; ſhe became his inſeparable campanion in his journeys into foreign countries, and in all his military expeditions. The peace of Pruth, by which the Ruſſian army was reſcued from certain deſtruction, has been wholly attributed to Catherine, though ſhe was little more than an inſtrument in procuring the conſent of Peter. The latter, in his campaign of 1711 againſt the Turks, having imprudently led his troops into a diſadvantageous ſituation, took the deſperate reſolution of cutting his way through the Turkiſh army in the night. With this reſolution he retired to his tent in an agony of deſpair, and gave poſitive orders, that no one ſhould be admitted under pain of death. In this important juncture the principal officers and the vice-chancellor Shafirof aſſembled in the preſence of Catherine, and drew up certain preliminaries in order to obtain a truce from the grand vizir. Plinipotentiaries being immediately diſpatched, without the knowledge of Peter, to the grand vizir, a peace was obtained upon more reaſonable terms than could have been expected. With theſe conditions, Catherine, notwithſtanding the orders iſſued by Peter, entered his tent, and prevailed upon him to ſign them. Catherine by her conduct on this occaſion, acquired great popularity; and the emperor particularly ſpecified her behaviour at Pruth, as one of the reaſons which induced him to crown her publickly at Moſcow with his own hand. This ceremony was performed in 1724: and although deſigned by Peter only as a proof of his affection, was the principal cauſe of her ſubequent elevation. Her influence continued undiminiſhed until a ſhort time before the death of the emperor, when ſome circumſtances happened which occaſioned ſuch a coolneſs between them as would probably have ended in a total rupture, if his death had not fortunately intervened. The original cauſe of this miſunderſtanding aroſe from the diſcovery of a ſecret connection between Catherine and her firſt chamberlain, whoſe name was Mons. The emperor, who was ſuſpicious of it, quitted Peterſburgh under pretence of removing to a villa for a few days, but privately returned to his winter palace in the capital. From thence he occaſionally ſent one of his confidential pages with a complimentary meſſage to the empreſs, as if he had been in the country, and with ſecret orders to obſerve her motions. From the page's information the emperor on the 3d night, ſurprized Catherine in an arbour of the garden with Mons; while his ſiſter, Madame Balke, who was firſt lady of the bed-chamber to the empreſs, was, in company with a page, upon the watch without the arbour. Peter, whoſe temper, naturally violent, was now juſtly inflamed, ſtruck Catherine with his cane, as well as the page who endeavoured to prevent him from entering the arbour, and then retired without uttering a word either to Mons or his ſiſter. A few days after, theſe perſons were taken into cuſtody, and Mons was carried to the winter palace, where no one had admiſſion to him but Peter, who himſelf brought him his proviſions. A report was at the ſame time circulated, that they were impriſoned for having received bribes, and making their influence over the empreſs ſubſervient to their own mercenary views. Mons being examined by Peter in the preſence of major-general Uſchakof, and threatened with the torture, confeſſed the corruption which was laid to his charge. He was beheaded; his ſiſter received five ſtrokes of the knout, and was baniſhed into Siberia: two of her ſons, who were chamberlains, were alſo degraded, and ſent as common ſoldiers among the Ruſſian troops in Perſia. On the day ſubſequent to the execution of the ſentence, Peter conveyed Catherine in an open carriage under the gallows, to which was nailed the head of Mons. The empreſs, without changing colour, at this dreadful ſight, exclaimed, "What a pity it is, that there is ſo much corruption among courtiers!" This event happened in the end of 1724; and as it was ſoon followed by Peter's death, and Catherine upon her acceſſion recalled Madame Balke, it has been ſuſpected, that ſhe ſhortened the days of her huſband by poiſon. But notwithſtanding the critical ſituation for Catherine in which he died, and her ſubſequent elevation, this charge is totally deſtitute of proof: for the peculiar ſymptoms of his laſt illneſs ſufficiently account for his death. While Peter was yet lying in his laſt agonies, ſeveral oppoſite parties were caballing to diſpoſe of the crown. At a conſiderable meeting of the principal nobility, it was ſecretly determined, on the moment of his diſſolution, to arreſt Catherine, and to place Peter Alexiowitz upon the throne. Baſſevitz, appriſed of this reſolution, repaired in perſon to the empreſs, although it was already night. "My grief and conſternation," replied Catherine, "render me incapable of acting myſelf: do you and prince Menzikof conſult together, and I will embrace the meaſures which you ſhall approve in my name." Baſſevitz, finding Menzikof aſleep, awakened and informed him of the preſſing danger which threatened the empreſs and her party. As no time remained for long deliberation, the prince inſtantly ſeized the treaſure-ſecured the fortreſs, gained the officers of the guards by bribes and promiſes; alſo a few of the nobility, and the principal clergy. Theſe partizans being convened in the palace, Catherine made her appearance: ſhe claimed the throne in right of her coronation at Moſcow; ſhe expoſed the ill effects of a minority; and promiſed, that, "ſo far from depriving the great duke of the crown, ſhe would receive it only as a ſacred depoſit, to be reſtored to him when ſhe ſhould be united, in another world, to an adored huſband, whom ſhe was now upon the point of loſing." The pathetic manner with which ſhe uttered this addreſs, and the tears which accompanied it, added to the previous diſtribution of large ſums of money and jewels, produced the deſired effect; at the cloſe of this meeting, the remainder of the night was employed in making the neceſſary preparations to inſure her acceſſion in caſe of the emperor's death.

Peter at length expired in the morning of the 28th Jan. 1725. This event being made known, the ſenate, the generals, the principal nobility and clergy, haſtened to the palace to proclaim the new ſovereign. The adherents of the great duke ſeemed ſecure of ſucceſs, and the friends of Catherine were avoided as perſons doomed to deſtruction. At this juncture Baſſevitz whiſpered to one of the oppoſite party, "The empreſs is miſtreſs of the treaſure and the fortreſs; ſhe has gained over the guards and the ſynod, and many of the chief nobility; even here ſhe has more followers than you imagine; adviſe therefore your friends to make no oppoſition as they value their heads." This information being rapidly circulated, Baſſevitz gave the appointed ſignal, and the two regiments of guards, who had been gained by a largeſs to declare for Catherine, and had already ſurrounded the palace, beat to arms. "Who has dared (exclaimed prince Repnin, the commander in chief) to order out the troops without my knowledge?" "I, (returned general Butterlin), without pretending to diſpute your authority, in obedience to the commands of my moſt gracious miſtreſs." This ſhort reply was followed by a dead ſilence. In this moment of ſuſpence and anxiety Menzikof entered, preceding Catherine, ſupported by the duke of Holſtein. She attempted to ſpeak, but was prevented by ſighs and tears from giving utterance to her words: at length, recovering herſelf, "I come (ſhe ſaid,) notwithſtanding the grief which now overwhelms me, to aſſure you, that, ſubmiſſive to the will of my departed huſband, whoſe memory will be ever dear to me, I am ready to devote my days to the painful occupations of government, until Providence ſhall ſummon me to follow him." Then, after a ſhort pauſe, ſhe artfully added, "If the great duke will profit by my inſtructions, perhaps I ſhall have the conſolation, during my wretched widowhood, of forming for you an emperor worthy of the blood and the name of him whom you have irretrievably loſt." "As this criſis, replied Menzikof, is a moment of ſuch importance to the good of the empire, and requires the moſt mature deliberation, your majeſty will permit us to confer, without reſtraint, that this whole affair may be tranſacted without reproach, as well in the opinion of the preſent age, as in that of poſterity." "Acting as I do (anſwered Catherine), more for the public good than for my own advantage, I am not afraid to ſubmit all my concerns to the judgment of ſuch an enlightened aſſembly: you have not only my permiſſion to confer with freedom; but I lay my commands upon you all to deliberate maturely on this important ſubject, and I promiſe to adopt whatever may be the reſult of your deciſions." At the concluſion of theſe words the aſſembly immediately retired into another apartment and the doors were locked. It was previouſly ſettled by Menzikof and his party that Catherine ſhould be empreſs; and the guards who ſurrounded the palace with drums beating and colours flying, effectually vanquiſhed all oppoſition. The only circumſtance, therefore, which remained, was to give a juſt colour to her title, by perſuading the aſſembly, that Peter intended to have named her his ſucceſſor. For this Menzikof demanded of that emperor's ſecretary, whether his maſter had left any written declaration of his intentions? The ſecretary replied, "That a little before his laſt journey to Moſcow he had deſtroyed a will: and that he had frequently expreſſed his deſign of making another, but had always been prevented by the reflection, that if he thought his people, whom he had raiſed from a ſtate of barbariſm to an high degree of power and glory, could be ungrateful, he would not expoſe his final inclinations to the inſult of a refuſal; and that if they recollected what they owed to his labours, they would regulate their conduct by his intentions, which he had diſcloſed with more ſolemnity than could be manifeſted by any writing." An altercation now began in the aſſembly; and ſome of the nobles having the courage to oppoſe the acceſſion of Catherine, Theophanes abp. of Pleſcof, called to their recollection the oath which they had all taken in 1722, to acknowledge the ſucceſſor appointed by Peter; and added that the ſentiments of that emperor delivered by the ſecretary were in effect an appointment of Catherine. The oppoſite party, however, denied theſe ſentiments to be ſo clear as the ſecretary choſe to inſinuate; and inſiſted, that as their late monarch had failed to nominate his heir, the election of the new ſovereign ſhould revert to the ſtate. Upon this the abp. farther teſtified, that the evening before the coronation of the empreſs at Moſcow, Peter had declared, in the houſe of an Engliſh merchant, that he ſhould place the crown upon her head with no other view, than to leave her miſtreſs of the empire after his deceaſe. This atteſtation being confirmed by many perſons preſent, Menzikof cried out, "What need have we of any teſtament! A refuſal to conform to the inclination of our great ſovereign, thus authenticated, would be both unjuſt and criminal. Long live the empreſs Catherine!" Theſe words being inſtantaneouſly repeated by the greateſt part of thoſe who were preſent, Menzikof, ſaluting Catherine by the title of empreſs, paid his firſt obeiſance by kiſſing her hand; and his example was followed by the whole aſſembly. She next preſented herſelf at the window to the guards, and to the people, who ſhouted acclamations of "Long live Catherine!" while Menzikof ſcattered amongſt them handfuls of money. Thus (ſays a contemporary) the empreſs was raiſed to the throne by the guards, in the ſame manner as the Roman emperors by the prætorian cohorts, without either the appointment of the people or the legions. The reign of Catherine may be conſidered as the reign of Menzikof, that empreſs having neither inclination nor abilities to direct the helm of government; and ſhe placed the moſt implicit confidence in a man who had been the original author of her good fortune, and the ſole inſtrument of her elevation to the throne. During her ſhort reign, her life was very irregular; ſhe was extremely averſe to buſineſs; would frequently, when the weather was fine, paſs whole nights in the open air; and was particularly intemperate in the uſe of Tokay wine. Theſe irregularities, joined to a cancer and a dropſy, haſtened her end; and ſhe expired on the 17th May 1727, little more than two years after her acceſſion

ceſſion to the throne, and about the 40th year of her age. As the deaths of ſovereigns in deſpotic countries are ſeldom imputed to natural cauſes, that of Catherine has alſo been attributed to poiſon; as if the diſorders which preyed upon her frame had not been ſufficient to bring her to her grave. But theſe reports deſerve not the leaſt credit, and were merely dictated by the ſpirit of party or by popular rumour. Catherine was in her perſon under the middle ſize, and in her youth delicate and well formed, but inclined to corpulency as ſhe advanced in years. She had a fair complexion, dark eyes, and light hair, which ſhe was always accuſtomed to dye with a black colour. She could neither read nor write: her daughter Elizabeth, uſually ſigned her name for her, and particularly to her laſt will and teſtament; and Count Oſterman generally put her ſignature to the public decrees and diſpatches. Her abilities have been greatly exaggerated by her panegyriſts. Gordon, who had frequently ſeen her, ſeems, of all writers, to have repreſented her character with the greateſt juſtneſs, when he ſays, "She was a very pretty well look'd woman, of good ſenſe, but not of that ſublimity of wit, or quickneſs of imagination, which ſome people have believed. The great reaſon why the czar was ſo fond of her, was her exceeding good temper; ſhe never was ſeen peeviſh or out of humour; obliging and civil to all, and never forgetful of her former condition; withal, mighty grateful." Catherine maintained the pomp of majeſty with an air of eaſe and grandeur united; and Peter uſed frequently to expreſs his admiration at the propriety with which ſhe ſupported her high ſtation, without forgetting that ſhe was not born to that dignity. The following anecdotes will prove that ſhe bore her elevation meekly. When Wurmb, who had been tutor to Gluck's children at the time that Catherine was a domeſtic in that clergyman's family, preſented himſelf before her after her marriage with Peter had been publicly ſolemnized, ſhe recollected and addreſſed him with great complacency, "What, thou good man, art thou ſtill alive! I will provide for thee." She accordingly ſettled upon him a penſion. She was no leſs attentive to the family of her benefactor Gluck; ſhe penſioned his widow; made his ſon a page; portioned the two eldeſt daughters; and advanced the youngſt to be one of her maids of honour. Weber ſays, ſhe frequently enquired after her firſt huſband; and, when ſhe lived with prince Menzikof, uſed ſecretly to ſend him ſmall ſums of money, until, in 1705, he was killed in a ſkirmiſh with the enemy. But the moſt noble part of her character was her humanity and compaſſion for the unfortunate. Motraye tells us, "She had, in ſome ſort, the government of all his (Peter's) paſſions; and even ſaved the lives of many more perſons than Le Fort was able to do: ſhe inſpired him with that humanity, which, in the opinon of his ſubjects, nature ſeemed to have denied him. A word from her mouth in favour of a wretch juſt going to be ſacrificed to his anger, would diſarm him: but if he was fully reſolved to ſatſify that paſſion, he would give orders for the execution when ſhe was abſent, for fear ſhe ſhould plead for the victim." In a word, to uſe the expreſſion of the celebrated Munich, "She was properly the mediatrix between the monarch and his ſubjects."

(2.) CATHERINE II. late empreſs of Ruſſia, a monarch who doubtleſs has a claim to be ranked among the *great* ſoveriegns of Europe, according to the uſual acceptation of the word, *greatneſs*, wherein *goodneſs* is not reckoned a neceſſary ingredient. She was the daughter of Chriſtian Auguſtus, prince of Anhalt-Zerbſt: was born, 2d May 1729, and baptized *Sophia Aguſta*; but, upon her marriage with the Grand Duke of Ruſſia, 1ſt Sept. 1745, and admiſſion into the Greek church, ſhe aſſumed the name of *Catherine*. Her huſband, Peter III. ſucceeded his aunt Elizabeth, Jan. 5, 1762, but had not reigned ſix months, when he fell a ſacrifice to his wife's ambition; being depoſed on the 28th June, and barbarouſly murdered on the 9th July following, in the ſame ſhocking manner, in which Edward II. of England periſhed. Upon the depoſition of her unfortunate huſband, Catherine II. was proclaimed empreſs of all the Ruſſias; and ſoon after endeavoured to conceal the crimes by which ſhe aſcended the throne, by the dazzling luſtre of ſome of thoſe actions, falſely called *great*, which have blotted the page of hiſtory with blood in all ages of the world, and have too long employed the pens of hiſtorians and poets, to record and to celebrate. The hiſtory of theſe tranſactions will be found under the article RUSSIA; but future hiſtorians will decide, whether the great exploits, diſplayed during her reign, are not more to be aſcribed to the natural ſtrength of the empire, the force of which it was her buſineſs to collect and concentrate, than to any ſuperior perſonal genius which ſhe poſſeſſed. As to the juſtice of theſe exploits, it need hardly be left to poſterity to judge. Without entering into the merits of her claims upon the Turkiſh dominions, her invaſion and partition of Poland, in conjuction with other powers, particularly the king of Pruſſia, affords as flagrant an inſtance of the violation of the rights of nations, by open and unprovoked robbery and murder, as is to be found in the annals of the moſt barbarous ſavages. In ſhort, the chief merit of Catherine, as a ſovereign, ſeems to have lien, like that of Queen Elizabeth of England, in ſelecting able miniſters, admirals, and generals, to carry on the operations ſhe had planned. In this reſpect, even her vices as a woman, which gave her the aſcendent of an imperious character over her favourites, exempt from the weakneſs of ſentiment, ſupplied the place of public virtues; and baniſhed from her government the degrading influence, which courtiers elſewhere often exerciſe. She at laſt, however, allowed herſelf to be ruled by her freed man, Sabor, who deceived her with regard to the ſtate of her forces, which did not amount to 200,000 men, though her military liſts contained 400,000: and her long preparations for the field terminated in a diſaſtrous war in Perſia, by which two of her armies were conſumed. If her policy in relation to Auſtria and Poland was attended with ſucceſs, it is, perhaps, leſs to be aſcribed to her interference, than to the good ſenſe ſhe diſplayed in allowing her miniſters to govern. Yet this policy was over-reached in her laſt war againſt the Turks, when, in ſpite of pompous promiſes, aſſiſting Auſtria only with feeble ſuccours, and ſuddenly finding her ſquadrons held bound by thoſe of Sweden, ſhe left to her rival all the advantages of many bloody campaigns; and excited in the Grand Signior a deſire of vengeance, which perhaps only waits the councils of an European ſtate to operate with effect. Nor were her plans of political aggrandiſement free from fluctuations and contradictions. During the American war, one would have imagined, that the *trident of Neptune* was by her exertions, about to become the ſacred ſymbol of *Liberty*. She preſented to the courts of Verſallies, Madrid, and London, a memorial, in which ſhe demanded, that the commerce of all nations, even of the belligerent powers, ſhould be free and reſpected. She propoſed that a league ſhould be formed for its ſupport, and for this purpoſe deputed prince Gallitzin to the General States. But, in 1793, ſhe avowed principles directly oppoſite. Influenced ſolely by her rage againſt France, ſhe announced war againſt that republic, without diſcuſſion, without manifeſto, without even being able to allege, with regard to a ſtate ſo remote from her territories, that barbarous maxim, which has ſlipped from the pen of Monteſquieu himſelf;—"that the law of natural defence ſometimes involves the neceſſity of attack, when a people ſees, that a longer peace would enable another power to effect their deſtruction." *Eſprit de Lois. L.* 10. *c.* 2. With all her foibles, however, Catherine had ſome right to the panegyrics of men of letters. She purchaſed the praiſes of ſeveral French philoſophers, and ſhe did not overlook the merits of ſome of our own Scots authors; witneſs the late Mr Bruce of Edinburgh. After the example of ſome of the tyrants of antiquity, ſhe renewed the ſingularity of royal and philoſophic banquets. Like Dionyſius, Piſiſtratus, Periander, and Hiero, ſhe collected Platos, Ariſtippi, Simonideſes, and Pindars at her ſuppers. The imperial reſentment, however, was ſometimes excited; on which occaſions the wit was rewarded with baniſhment; a premium which Diderot received for his frankneſs. The compliment ſhe paid to the rhetorical merits of Mr Fox, by commiſſioning his buſt, and placing it between thoſe of Cicero and Demoſthenes in her library, for his having prevented the threatened rupture between Great Britain and Ruſſia, reflects honour on her memory, as well as on that public-ſpirited orator. Her purchaſing the libraries, letters and papers of Meſſrs Voltaire and D'Alembert alſo evidenced her literary taſte; unleſs, as a French writer ſuſpects, ſhe did it with a view to bury the relics of theſe great men. "But her refuſal," he adds, "to give effect to the uſeful inſtructions collected under her orders, by the learned travellers of the academy of St Peterſburgh, under the direction of Pallas and Gmelin, proves clearly that the deſire of a vain luſtre, rather than the real utility of nations, was the motive of the protection ſhe affected to give to artiſts and to men of letters. A life of Catherine II. was lately publiſhed at Paris, ſaid to be written with a ſtrict adherence to truth. The ſtrongeſt feature it gives of her character is, her marked averſion to her ſon Paul, her ſucceſſor. He owed his preſervation to the public regard, and would have been ſacrificed to the ambition of Prince Potemkin, if the deed could have been perpetrated with impunity. Prince Paul being one day indiſpoſed, the people, who had not forgotten the tragical end of Peter III. ſurrounded the caſtle and deſired to ſee him. The Empreſs brought him forward, pale, trembling, and fearful for her own ſafety. "To this legitimate terror, inſpired by the people, (ſays the French annotator,) they owe the exiſtence of a prince, who wiſhes nothing more than the happineſs of his ſubjects." This extraordinary woman died ſuddenly and unſeen, in her water cloſet, on the 17th Nov. 1796, in the 67th year of her age. We ſhall conclude this memoir, with two ſketches of her character, drawn by writers of very oppoſite opinions reſpecting her; leaving the reader to draw his own inference from the whole. The firſt is by M. De la Croix, who ſpeaking of Ruſſia, ſays, "This mighty empire was groſsly hewn out by Peter the Great. The rough form of this coloſſal figure was ſoftened by Elizabeth; and it has received more of the human appearance from the able hand of Catherine II. who by the inſtructions, which ſhe gave the commiſſioners, charged with preparing a new code of laws, has proved herſelf worthy of governing a great empire. She has done more for Ruſſia by her equity and her beneficence, than all their generals have done by their warlike virtues. It is of little advantage to ſo vaſt an empire to have its bounds extended. Its true wellfare is more eſſentialy promoted, by favouring population by wiſe laws; by encouraging induſtry; by increaſing its riches by commerce; by cultivating the arts, and reconciling them to a ſtubborn ſoil, ungenial to their nature; by meliorating the maaners of a ſtill ſavage race of nobles; and by communicating ſenſibility to a people, whom the roughneſs of their climate had rendered impenetrable to all the ſoft affections and ſocial virtues of humanity. Theſe are the works, which already make the name of Catherine illuſtrious, and which will reflect ſo much glory on her memory."—The other is part of an addreſs by an anonymous author, to the *Czarina*, which was inſerted in moſt of our public papers a few years ago.—

"Baſe counterfeit of all that's mild and good!
The Lord's anointed—with a huſband's blood!
Thro' blood now wading to a foreign throne,
Exulting o'er expiring freedom's groan:
Lover of men, yet ſcourge of human kind:
Compoſt of luſt and cruelty combin'd:
Still for new kingdoms ſtruggling, doſt thou brave
Threeſcore and ten years, and the yawning grave?
Thy mad ambition wilt thou never curb,
But ſtill with wars the weary world diſturb?
Thou PROOF OF HELL!"

(3.) CATHERINE PARR. See PARR.

(4.) * CATHERINE PEAR. See PEAR.—

For ſtreaks of red were mingled there,
Such as are on a *Catherine pear*,
The ſide that's next the ſun.

Suckling.

(5—7.) CATHERINE, ST. See CATHARINE.

(8.) CATHERINE, ST, an iſland of Braſil. See ST CATHERINE.

(9.) Catherine, St, an iſland of Georgia, on the coaſt of Sunbury.

(10.) Catherine, St, a fertile iſland on the S. coaſt of Hiſpaniola; 20 league E. of St Domingo eity.

CATHERINEBERG, a town of Sweden in W. Gothland, the birth-place of Sir Torbern Bergman.

(1.) CATHERINENBURG, a territory of Aſiatic Ruſſia, in Siberia.

(2.) Catherinenburg, the capital of the above diſtrict, (N° 1.) regularly built in the German manner, with a fort and garriſon, ſeated on the river Iſſet.

(1.) CATHERINENSLAF, or Ecaterinenslaf, one of the 41 governments of the Ruſſian empire, being the new name of the whole extended government of Asoph, which is divided into 2 provinces, viz. Catherinenslaf, (ſee N° 2.) and Taurida, which includes the Crimea.

(2.) Catherinenslaf, one of the two provinces above-mentioned, (N° 1.) comprehends New Ruſſia and the ci-devant government of Aſoph. See Asoph, N° 1.

(3.) Catherinenslaf, the capital of the above province (N° 2.) is ſeated near the junction of the Kiltzin and the Samara. It was built by the late empreſs Catherine II. (See Asoph, N° 1.) and coloniſed by many Greeks and Armenians from Crim Tartary and others, who ſerved in the preceding war againſt the Turks. It is 178 miles NE. of Cherſon. Lon. 35. 15. E. Lat. 57. 23. N.

CATHERSTON, a town in Dorſetſhire, N. of Charmouth.

(1.) * CATHETER. *n. ſ.* [καθετηρ.] A hollow and ſomewhat crooked inſtrument, to thurſt into the bladder, to aſſiſt in bringing away the urine, when the paſſage is ſtopped by the ſtone or gravel.—A large cluſter, ſuddenly injected, hath frequently forced the urine out of the bladder; but if it fail, a *catheter* muſt help you. *Wiſeman.*

(2.) Catheter. See Surgery, *Index.*

CATHETERISMUS, an operation by the catheter.

CATHETOLIPES, in natural hiſtory, the name of a genus of foſſils of the claſs of the selenitæ, but differing from the common kinds, in the conſtituent plates being ranged perpendicularly, and not horizontally on each other.

CATHETOPLATEOUS, *adj.* in ichthyology, compreſſed.

(1.) CATHETUS, in architecture, a perpendicular line, ſuppoſed to paſs through the middle of a cylindrical body, as a balluſter, column, &c.

(2.) Cathetus, in geometry, a line or radius falling perpendicularly on another line or ſurface; thus the catheti of a right-angled triangle. are the two ſides that include the right angle.

(3.) Cathetus of incidence, in catoptrics, a right line drawn from a point of the object, perpendicular to the reflecting line.

(4.) Cathetus of obliquation, a right line drawn perpendicular to the ſpeculum, in the point of incidence or reflection.

(5.) Cathetus of reflection, or } a right
Cathetus of the eye, } line,
drawn from the eye perpendicular to the reflecting plane.

* CATHOLES. *n. ſ.* [In a ſhip.] Two little holes aſtern above the gun-room ports, to bring in a cable or hawſer through them to the capſtain, where there is occaſion to heave the ſhip aſtern. *Sea Dict.*

(1.) CATHOLIC. See Catholick.

(2.) Catholic church. The riſe of hereſies induced the primitive Chriſtian church to aſſume to itſelf the appellation of *catholic*, being a characteriſtic to diſtinguiſh itſelf from all ſects, who, though they had party names, ſometimes ſheltered themſelves under the name of Chriſtians. The Romiſh church now diſtinguiſhes itſelf by the name of *catholic*, in oppoſition to all who have ſeparated from her communion, and whom ſhe conſiders as heretics and ſchiſmatics, and herſelf only as the true and Chriſtian church. In the ſtrict ſenſe of the word, there is no catholic church in being, that is, no *univerſal* Chriſtian communion.

CATHOLICIANI, officers under the Catholicus; called alſo *Cæſariani.* See Cæsarians.

* CATHOLICISM. *n. ſ.* [from *catholick.*] Adherence to the catholick church.

(1.) * CATHOLICK. *adj.* [*catholique*, Fr. καθολικος, univerſal or general.] 1. The church of Jeſus Chriſt is called *catholick*, becauſe it extends throughout the world, and is not limited by time. 2. Some truths are ſaid to be *catholick*, becauſe they are received by all the faithful. 3. *Catholick* is often ſet in oppoſition to heretick or ſectary, and to ſchiſmatick. 4. *Catholick*, or canonical epiſtles, are ſeven in number; that of St James, two of St Peter, three of St John, and that of St Jude. They are called *catholick*, becauſe they are directed to all the faithful, and not to any particular church; and canonical, becauſe they contain excellent rules of faith and morality. *Camlet.*—Doubtleſs the ſucceſs of thoſe your great and *catholick* endeavours will promote the empire of man over nature, and bring plentiful acceſſion of glory to your nation. *Glanville's Sceſis.*

(3.) Catholic king, a title which has been long hereditary to the king of Spain. Mariana pretends, that Recarede firſt received this title after he had deſtroyed Arianiſm in his kingdom, and that it is found in the council of Toledo for the year 589. Vaſcè aſcribes the origin of it to Alphonſus I. in 738. Some alledge that it has been uſed only ſince the time of Ferdinand and Iſabella. Colombiere ſays, it was given them on occaſion of the expulſion of the Moors. The Bollandiſts pretend it had been born by their predeceſſors the Viſigoth kings of Spain; and that Alexander VI. only renewed it to Ferdinand and Iſabella. Others ſay, that Philip of Valois firſt bore the title; which was given him after his death by the eccleſiaſtics, on account of his favouring their intereſts. In ſome epiſtles of the ancient popes, the title *catholic* is given to the kings of France and of Jeruſalem, as well as to ſeveral patriarchs and primates.

(1.) * CATHOLICON. *n. ſ.* [from *catholick*; καθολικον ιαμα.] An univerſal medicine.—Preſervation againſt that ſin, is the contemplation of the laſt judgment. This is indeed a *catholicon* againſt all; but we find it particularly applied to St Paul to judging and deſpiſing our brethren. *Government of the Tongue.*

(2.) **Catholicon**, in pharmacy, a kind of ſoft purgative electuary, ſo called, as being ſuppoſed an univerſal purger of all humours.

CATHOLICUS, a magiſtrate under the Roman emperors, who had the care of the revenues in the dioceſes.

CAT-HOOK, in ſea-affairs, the hook of the Cat, which is uſed to draw up the anchor from the hawſe to the top of the fore-caſtle.

CATHORE, or } in Scots law, a penalty for
CATHORIUS, } breaking the peace.

CATHORP, the name of 4 Engliſh villages: viz. 1. in Leiceſterſhire, near Rugby: 2. in Linconſh. W. of Sleaford: 3. in Nottinghamſh. and 4. in Yorkſhire, W. of Bridlington.

CATIEUCHLANI, an ancient people of S. Britain, who inhabited the territories now called Warwickſhire, Buckinghamſhire and Bedfordſhire. See Catti, N° 2.

CATILINARIAN war, the civil war occaſioned by Catiline.

CATILINE, Lucius Sergius, a Roman of a patrician family, who having ſpent his fortune in debauchery, formed the deſign of deſtroying the ſenate, ſeizing the public treaſury, ſetting Rome on fire, and uſurping a ſovereign power over his fellow citizens. He drew ſome young noblemen into his plot: whom he prevailed upon, it is ſaid, to drink human blood as a pledge of their union. His conſpiracy, however, was diſcovered by the vigilance of Cicero, who was then conſul. Upon which, retiring from Rome, he put himſelf at the head of an army, with ſeveral of the conſpirators, and fought with incredible valour againſt Petreius, lieutenant to Anthony, who was colleague with Cicero in the conſulſhip; but was defeated and killed in battle. See Rome, history of. Salluſt has given an excellent hiſtory of this conſpiracy.

CATIMARONS. See Cantimarons.

CATINI, the ancient inhabitants of Caithneſs.

CATIVULCUS, a king of the Eburones, who poiſoned himſelf, that he might not fall into the hands of Cæſar.

CATIUS, in ancient mythology, the power which was ſuppoſed to make men circumſpect.

(1.) **CATKIN**. See Botany, *Index*.

(2.) * **Catkins**. *n. ſ.* [*kattekens*, Dutch. In botany.] An aſſemblage of imperfect flowers hanging from trees, in manner of a rope or cat's tail; ſerving as male bloſſoms, or flowers of the trees, by which they are produced. *Chambers*.

CATLAW, one of the Grampian mountains, ſituated in the county of Angus, the elevation of which, by barometrical menſuration, is found to be 2264 feet above the level of the ſea.

(1.) **CATLEY**, Anne, a late celebrated Engliſh actreſs, was born in 1745. Her father kept a public houſe near Norwood. Poſſeſſing a genius for muſic, ſhe was bound apprentice to Mr Bates, a compoſer of ſome eminence. Her firſt public appearance was at Vauxhall in 1763; and on the 8th of Oct. ſhe firſt appeared on the ſtage at Covent Garden, in the character of the paſtoral nymph, in Comus. In 1763, ſhe became an object of public attention, from a charge brought by her father againſt Bates, Sir Francis Delaval, and Fraine, an attorney, for a conſpiracy; the firſt aſſigning her over for proſtitution to Sir Francis, who paid Bates L.200, and the laſt for drawing the deeds uſed on the occaſion. Theſe facts appearing by the affidavits, the Court of King's Bench ordered information againſt the defendants; who ſeem to have compromiſed the buſineſs, as nothing farther was done in it. She ſoon after went to Ireland, where ſhe continued till 1770, when ſhe returned to Covent Garden. Being attentive to œconomy, ſhe ſoon amaſſed a conſiderable fortune, and in 1784 retired to independence: which, however, ſhe did not long enjoy, as ſhe died at Gen. Laſcelles's houſe, (to whom, it was ſaid, ſhe was privately married,) Oct. 14, 1789. Her muſical and theatrical talents were not her only merits. Along with great beauty of perſon, ſhe poſſeſſed much ſenſibility of mind, and her generous hand often lightened the heavy heart. If ſhe was not a perfect *Lucretia*, let her ſituation in life mollify the voice of cenſure, and let the chief blame fall where it ought, upon her ſeducers.

(2.) **Catley**, a village in Lincolnſhire, W. of the ferry over the Witham.

CATLIDGE, 2 miles from Newmarket, Cambridge.

* **CATLING**. *n. ſ.* 1. A diſmembering knife, uſed by ſurgeons. *Harris*. 2. It ſeems to be uſed by *Shakeſpeare* for catgut; the materials of fiddle ſtrings.—What muſick there will be in him after Hector has knocked out his brains, I know not. But, I am ſure, none; unleſs the fiddler Apollo get his ſinews to make *catlings* of. *Shakeſp.* 3. The down or moſs growing about walnut trees, reſembling the hair of a cat. *Harris*.

CATMAMOU, or } the capital of Napaul, in
CATMANDU, } Hindooſtan Proper, 445 miles E. of Delhi. Lon. 84. 51. E. Lat. 28. 6. N.

CATMER, near Farnborough, Berkſhire.

(1.) * **CATMINT**. *n. ſ.* [*cataria*, Lat.] The name of a plant. *Miller*.

(2.) **Catmint**. See Nepeta.

CATMOUSE hill, } SE. of Okeham, in Rut-
Catmouse vale, } landſhire.

(1.) **CATO**, Marcus Porcius, Major, the Cenſor, one of the greateſt men among the ancients, was born at Tuſculum, A. U. C. 519, and A. A. C. 232. He began to bear arms at 17; and, on all occaſions, ſhowed extraordinary courage. He was a man of great ſobriety, and reckoned no bodily exerciſe unworthy of him. He had but one horſe for himſelf and his baggage, and he dreſſed it himſelf. At his return from his campaign, he plowed his own ground, though he had ſlaves to do it. He dreſſed alſo like his ſlaves, ſat down at the ſame table with them, and partook of the ſame fare. He employed his rhetorical talents, in generouſly pleading cauſes in the neighbouring cities without fee or reward. Valerius Flaccus, who had a country ſeat near Cato, conceiving an eſteem for him, perſuaded him to come to Rome; where Cato, by his own merit, and the influence of ſo powerful a patron, was ſoon taken notice of. He was firſt elected tribune of the ſoldiers for Sicily. He was next made queſtor in Africa under Scipio, whom he reproved for his profuſeneſs to his ſoldiers. Being afterwards made prætor, he fulfilled the duties of that office with the ſtricteſt juſtice. He conquered Sardinia, governed it with admirable moderation, and was elected conſul. Being tribune in the Syrian war, he gave diſtinguiſhed proofs of his valour againſt Antiochus the Great; and at his return ſtood candidate for the cenſorſhip. But the nobles, who not only envied him as a *new* man, but dreaded his ſeverity, ſet up againſt him 7 powerful competitors. Valerius Flaccus, who had been his colleague in the conſulſhip, was a ninth candidate, and theſe two united their intereſts. On this occaſion Cato, far from flattering the people, or giving hopes of gentleneſs in the execution of his office, declared from the roſtra, with a threatening look and voice, "That the times required firm and vigorous magiſtrates to put a ſtop to that growing luxury which menaced the republic with ruin; cenſors who would cut up the evil by the roots, and reſtore the rigour of ancient diſcipline." To the honour of the Romans, notwithſtanding theſe terrible intimations, they preferred him to all his competitors, who courted them by promiſe of a mild adminiſtration. The comitia alſo appointed his friend Valerius to be his colleague, without whom he had declared, that he could not hope to compaſs the reformations he had in view. Cato's merit was indeed ſuperior to that of any of the great men who ſtood againſt him. He was frugal of the public money, and not to be corrupted. He was a great ſoldier, an able ſtateſman, an eloquent orator, a learned hiſtorian, and very knowing in rural affairs. Yet, with all theſe accompliſhments, he had very great faults. His ambition being poiſoned with envy, diſturbed both his own peace and that of the whole city, as long as he lived. Though he would not take bribes, he amaſſed wealth, by all ſuch means as the law did not puniſh. The firſt act of Cato in his new office, was naming his colleague to be prince of the ſenate: after which the cenſors ſtruck out of the liſt of the ſenators the names of 7 perſons; among whom was Lucius the brother of T. Flaminius. Lucius, when conſul, and commanding in Gaul, had with his own hand murdered a Boian of diſtinction, who had deſerted to the Romans; merely to gratify his pathic, a young Carthaginian, who longed to ſee ſomebody die a violent death. Titus Flaminius brought the affair before the people, who highly approved of Cato's conduct. But what moſt offended the nobles and their ladies, was the taxes he laid upon luxury in all its branches; dreſs, houſehold furniture, women's toilets, chariots, ſlaves, and equipage. Theſe articles were all taxed at 3 per cent of their value. The people, however, were ſo pleaſed with his regulations, that they ordered a ſtatue to be erected to his honour in the temple of *Health*, with an inſcription importing, that by his wiſe ordinances in his cenſorſhip, he had reformed the manners of the republic. Plutarch relates, that before this, upon ſome of Cato's friends expreſſing their ſurpriſe, that while many perſons without merit or reputation had ſtatues, he had none; he anſwered, "I had much rather it ſhould be aſked why the people have *not* erected a ſtatue to Cato, than why they *have*." Cato was the occaſion of the third Punic war, and the total deſtruction of Carthage. See CARTHAGE, N° I. § 6. Being diſpatched to Africa to terminate a difference between the Carthaginians and the king of Numidia, on his return to Rome he reported, that Carthage was grown exceſſively rich and populous, and he warmly exhorted the ſenate to deſtroy a city and republic, during the exiſtence of which, Rome could never be ſafe. From this time he never ſpoke in the ſenate upon any ſubject, without concluding with theſe words, "I am alſo of opinion, that Carthage ought to be deſtroyed." He judged, that, for a people debauched by proſperity, nothing was more to be feared than a rival ſtate, always powerful, and now from its misfortunes grown wiſe and circumſpect. He held it neceſſary to remove all dangers from *without*, when the republic had *within* ſo many diſtempers threatening her deſtruction. But he did not foreſee, that when the rival republic was deſtroyed, the Romans themſelves would avenge the cauſe of Carthage, by their inteſtine diſſentions; and that their liberty would periſh in the conflict. The only apology that can be made for Cato's inhumanity, in recommending the deſtruction of a whole people, is, that *univerſal philanthropy* was not then underſtood. Philanthropy and patriotiſm, were then merely *local virtues*, which the wiſeſt philoſophers of Greece and Rome never thought of extending to the *whole human race*. This great duty, which exalts modern ethics ſo far above the ancient, and which makes no diſtinction of mankind from country or complexion, was reſerved to be promulgated by an illiterate native of a barbarous country; who firſt taught his narrow-minded countrymen, to conſider even the *Samaritans* as their brethren and neighbours.—Cato, however ſevere as a public magiſtrate, was, in private life, often ſociable and good-humoured. With his friends at table he intermixed the converſation with lively diſcourſes and witty ſayings. Of theſe Plutarch has collected a pretty large number; of which we ſhall relate but one. He had married a very handſome wife, who being extremely afraid of thunder, always threw herſelf into her huſband's arms at the leaſt noiſe ſhe heard in the ſky. Cato, who was very willing to be careſſed, told his friends that "his wife had found out a way to make him love bad weather; and that he never was ſo happy as when Jupiter was angry." This was during his cenſorſhip, when he degraded the ſenator Manlius, who would probably have been conſul the year after, only for giving a kiſs to his wife in the day time, and in the preſence of his daughter. Cato died A. U. C. 604, aged 85. He wrote ſeveral works: viz. 1. A Roman Hiſtory. 2. Concerning the art of War. 3. Of rhetoric. 4. A treatiſe of huſbandry. Of theſe, the laſt only is extant.

(2.) **CATO**, Marcus Portius, **MINOR**, was great grandſon of Cato *the Cenſor*, (N° 1.) From his infancy he diſcovered even in his childiſh ſports an inflexibility of mind; for he would go through with whatever he had undertaken, though the taſk was ill ſuited to his ſtrength. He was rough towards thoſe who flattered him, and quite untractable when threatened; was rarely ſeen to laugh, or even to ſmile; was not eaſily provoked to anger; but if once incenſed, hard to be pacified. Sylla, having had a friendſhip for the father

ther of Cato, ſent often for him and his brother, and talked familiarly with them. Cato, who was then about 14 years of age, ſeeing the heads of great men brought in, and obſerving the ſighs of thoſe that were preſent, aſked his preceptor, "Why does nobody kill this man?" Becauſe, ſaid the other, he is more feared than he is hated. The boy replied, Why then did you not give me a ſword when you brought me hither, that I might have ſtabbed him, and freed my country from this ſlavery? He learned the principles of the Stoic philoſophy, under Antipater of Tyre. Eloquence he likewiſe ſtudied, to defend the cauſe of juſtice, and he made a very conſiderable proficiency in it. To increaſe his bodily ſtrength, he inured himſelf to extremes of heat and cold; and uſed to make journeys on foot, and bare-headed in all ſeaſons. When he was ſick, patience and abſtinence were his only remedies. Though remarkably ſober in the beginning of his life, making it a rule to drink but once after ſupper, he inſenſibly contracted a habit of drinking more freely, and of ſitting at table till morning. His friends excuſed this, by ſaying that the affairs of the public engroſſed his attention all the day; and that, being ambitious of knowledge, he paſſed the night in the converſation of philoſophers. Cæſar wrote that Cato was once found dead drunk at the corner of a ſtreet, early in the morning, and that the people bluſhed when they found it was Cato. He affected ſingularity, and, in things indifferent, to act directly contrary to the taſte and faſhions of the age. Magnanimity and conſtancy are generally aſcribed to him. Cato, ſays Seneca, having received a blow in the face, neither took revenge nor was angry; he did not even *pardon the affront*, but *denied that he had received it.* His virtue raiſed him ſo high, that injury could not reach him. He is reputed to have been chaſte in his youth. His firſt love was Lepida; but when the marriage was upon the point of being concluded, Scipio Metellus, to whom ſhe had been promiſed, interfered, and the preference was given to him. Our Stoic was for going to law with Scipio; but his friends diverted him from that deſign, and he revenged himſelf by making verſes upon his rival. He married Attilia the daughter of Serranus, had two children by her, and afterwards divorced her for very indiſcreet conduct. He ſerved as a volunteer under Gallius in the war of Spartacus; but refuſed the military rewards offered him by the commander. Some years after, he went a legionary tribune into Macedonia, in which ſtation he appeared, in his dreſs, and during a march, more like a private ſoldier than an officer; but the dignity of his manners, and the elevation of his ſentiments, ſet him far above the generals and proconſuls. Cato's deſign in all his behaviour was to engage the ſoldiers to the love of virtue; whoſe affections he engaged thereby to himſelf, without intending it. When his ſervice expired, the ſoldiers were all in tears; ſo effectually had he gained their hearts by his condeſcending manners. On his return home, he was choſen queſtor; and had ſcarce entered on his charge, when he made a great reformation with regard to the regiſters, whoſe places were for life, and through whoſe hands all the public accounts paſſed. He greatly pleaſed the people, by making the aſſaſſins, to whom Sylla had given conſiderable rewards, for murdering the proſcribed, diſgorge their gains. He was always the firſt who came to the ſenate houſe, and the laſt who left it; and he never quitted Rome during thoſe days when the ſenate was to ſit. He was alſo preſent at every aſſembly of the people, that he might awe thoſe who, by an ill-judged facility, beſtowed the public money in largeſſes, and frequently, through mere favour, granted remiſſion of debts due to the ſtate. At firſt his auſterity and ſtiffneſs diſpleaſed his colleagues; but afterwards they were glad to have his name to oppoſe to all the unjuſt ſolicitations, againſt which they would have found it difficult to defend themſelves. To keep out a very bad man, he put in for the tribunate. He ſided with Cicero againſt Catiline, and oppoſed Cæſar on that occaſion. His enemies ſent him to recover Cyprus, which Ptolemy had forfeited, thinking to hurt his reputation by ſo difficult an undertaking; yet none could find fault with his conduct. He tried to bring about an agreement between Cæſar and Pompey; but ſeeing it in vain, he ſided with the latter. When Pompey was ſlain, he fled to Utica; and being purſued by Cæſar, adviſed his friends to be gone, and throw themſelves on Cæſar's clemency. His ſon, however, remained with him; and Statilius, a young man, remarkable for his hatred to Cæſar. The evening before his death, after bathing, he ſupped with his friends and the magiſtrates of the city. They ſat late, and the converſation was lively. The diſcourſe falling upon this maxim of the Stoics, that "the wiſe man alone is free, and that the vicious are ſlaves;" Demetrius, who was a Peripatetic, undertook to confute it. Cato, in anſwer, treated the matter with ſo much earneſtneſs and vehemence of voice, that he confirmed the ſuſpicions of his friends, that he deſigned to kill himſelf. When he had done ſpeaking, a melancholy ſilence enſued; and Cato perceiving it, turned the diſcourſe to the preſent ſituation of affairs, expreſſing his concern for thoſe who had been obliged to put to ſea, as well as for thoſe who had determined to make their eſcape by land, and had a dry and ſandy deſart to paſs. The company being diſmiſſed, he walked for ſome time with a few friends, and going into his chamber, embraced his ſon with more than uſual tenderneſs, which farther confirmed the ſuſpicions of his reſolution. Then lying down on his bed, he took up Plato's Dialogue on the Immortality of the Soul. Having read for ſome time, he looked up and miſſing his ſword, which his ſon had removed, he called a ſlave, and aſked who had taken it away; and receiving no pertinent anſwer, he reſumed his reading. Some time after, he aſked again for his ſword; and, without ſhowing any impatience, ordered it to be brought to him; but, having read out the book, and finding nobody had brought it, he called for all his ſervants, fell into a rage, and ſtruck one of them on the mouth with ſo much violence, that he very much hurt his own hand, crying out in a paſſionate manner, "What! do my own ſon and family conſpire to betray me, and deliver me up naked and unarmed to the enemy?" Immediately his ſon and friends ruſhed into the room; and began to lament, and to beſeech him to change his reſolution. Cato raiſing himſelf, and looking fiercely at them, "How long is it," ſaid he, "ſince I have loſt my ſenſes, and my ſon is become my keeper? Brave and generous ſon, why do you not bind your father's hands, that when Cæſar comes, he may find me unable to defend myſelf? Do you imagine that without a ſword I cannot end my life?" His ſon anſwered with tears, and retired. Apollonides and Demetrius remained with him, to whom, among other things, he ſaid, "Is it to watch over me that ye ſit ſilent here? Do you pretend to force a man of my years to live? Not that I have determined any thing concerning myſelf; but I would have it in my power to perform what I ſhall think fit to reſolve upon. Go tell my ſon, that he ſhould not compel his father to what he cannot perſuade him." They withdrew, and the ſword was brought by a young ſlave. Cato drew it, and finding the point to be ſharp; "Now, (ſaid he,) I am my own maſter:" And, laying it down, he took up his book again, which he read twice over. After this he ſlept ſo ſoundly that he was heard to ſnore by thoſe near him. About midnight he called two of his free men, Cleanthes his phyſician, and Butas whom he chiefly employed in the management of his affairs. The laſt he ſent to the port, to ſee whether all the Romans were gone; to the phyſician he gave his hand to be dreſſed, which was ſwelled by the blow he had given his ſlave. This was thought an intimation that he intended to live, and gave great joy to his family. It was now break of day, and Cato ſlept yet a little more, till Butas returned to tell him, that all was perfectly quiet. He then ordered him to ſhut his door, and flung himſelf upon his bed, as if he meant to finiſh his night's reſt; but immediately he took his ſword, and ſtabbed himſelf a little below his cheſt; yet not being able to uſe his hand ſo well by reaſon of the ſwelling, the wound did not kill him. It threw him into a convulſion, in which he fell upon his bed, and overturned a table near it. The noiſe gave the alarm; and his ſon and friends, entering the room, found him weltering in his blood, and his bowels half out of his body. The ſurgeon, upon examination, found that his bowels were not cut; and was preparing to replace them, and bind up the wound, when Cato, recovering, thruſt the ſurgeon from him, and, tearing out his bowels, immediately expired, in the 48th year of his age. By this raſh act, independent of all other conſiderations, he carried his patriotiſm to the higheſt degree of political frenzy: for Cato, dead, could be of no uſe to his country; but had he preſerved his life, his counſel might have moderated Cæſar's ambition, and (as Monteſquieu obſerves) have given a different turn to public affairs.

CATOCHE, or CATOCHUS, } a diſeaſe, by which the patient is rendered in an inſtant as immoveable as a ſtatue, without either ſenſe or motion, and continues in the ſame poſture he was in at the moment of his being ſeized. See MEDICINE, *Index*.

CATODON, in ichthyology, a ſpecies of phyſeter. See PHYSETER, N° 1.

CATOLICA, or CATHOLICA, a village of Italy, in the dep. of the Rubicon, and ci-devant Papal province of Romagna, ſituated on an eminence, to which the Catholic biſhops retired from the ſynod held at Rimini, A. D. 359, when they were out-voted by the Arians, whence the name.

CAT-O'-MOUNTAIN. See CAT-A-MOUNTAIN, and LYNX.

CATON, a town SW. of Scarborough, Yorkſh.

CATONIAN, *adj.* grave, like Cato. *Aſh.*

CATOPSIS, in medicine, dimneſs of ſight, more generally called MYOPIA.

CATOPTER, a mirror.

* CATOPTRICAL. *adj.* [from *catoptricks.*] Relating to catopricks, or viſion by reflection.—A *catoptrical* or dioptrical heat is ſuperior to any, vitrifying the hardeſt ſubſtances. *Arbuth. on Air.*

CATOPTRICKS.

INTRODUCTION.

DEFINITIONS *and* HISTORY *of* CATOPTRICS.

(1.) * CATOPTRICKS. *n. ſ.* [κατοπτρον, a looking glaſs] That part of opticks which treats of viſion by reflection.

(2.) CATOPTRICS is the ſcience of reflex viſion, which explains the laws and properties of light reflected from mirrors or ſpecula.

(3.) The earlieſt treatiſe extant on this ſubject is ſaid to have been compoſed by EUCLID: it was publiſhed in Latin in Herigon's Courſe of Mathematics, and in Dr Gregory's edition of Euclid's works. This piece, however, is ſo imperfect, that ſome with reaſon ſuſpect, that Euclid was not its author, although it be aſcribed to him by Proclus, and by Marinus in his preface to Euclid's Data.

(4.) ARCHIMEDES is ſaid to have written a treatiſe on that part of Catoptrics which relates to burning mirrors, but which is now loſt, as well as ſome other treatiſes written by that celebrated mathematician.

(5.) ALHAZEN, an Arabian author, compoſed a large volume upon optics, about the year 1100, in which he treats pretty fully of catoptrics; and after him, VITELLO, a Poliſh writer, compoſed another, about the year 1720.

(6.) The chief propoſitions relating to plane and ſpherical mirrors have been well demonſtrated by Taquet, in his *Optics*, and by Dr Barrow in his *Optical Lectures*; as well as in *Trabe's Catoptrics*; David Gregory's *Elements of Catoptrics and Dioptrics*; thoſe of Dr Smith, contained in his learned and elaborate treatiſe *on Optics*; and many others of leſs note.

CATOPTRICS.

Plate LXII.

Fig. 1.

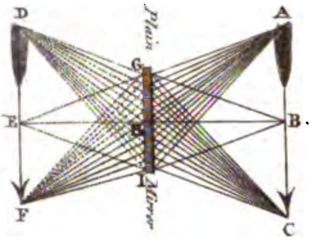


Fig. 2.

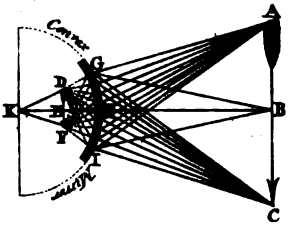


Fig. 3.

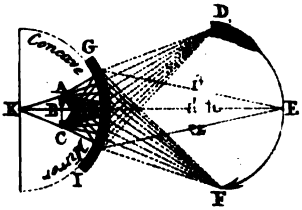


Fig. 4.

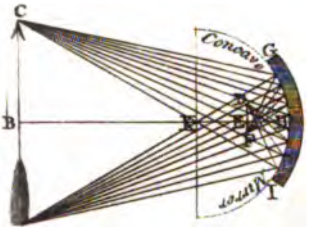


Fig. 5.

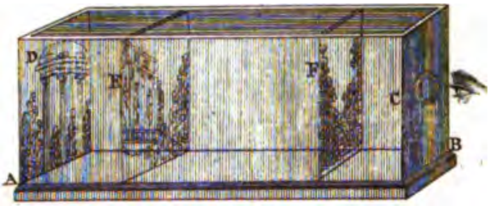


Fig. 6.

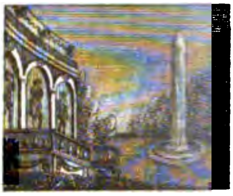


Fig. 7.

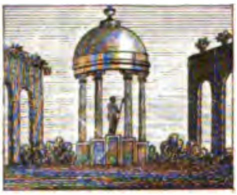


Fig. 8.

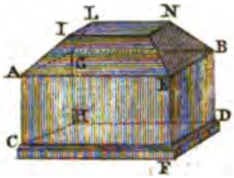


Fig. 9.

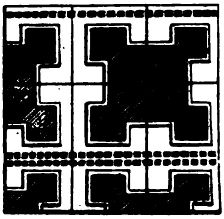


Fig. 11.

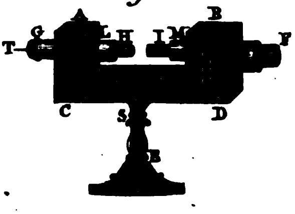


Fig. 10.

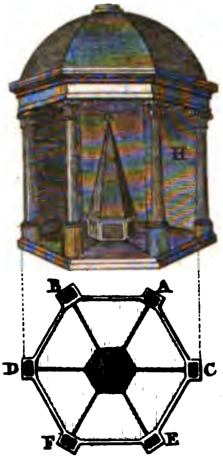


Fig. 13.

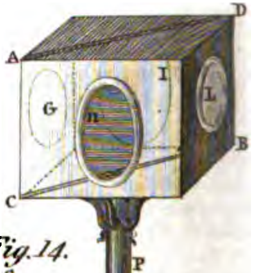


Fig. 12.

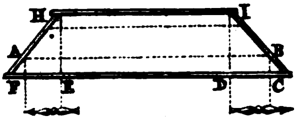


Fig. 14.

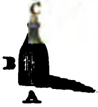
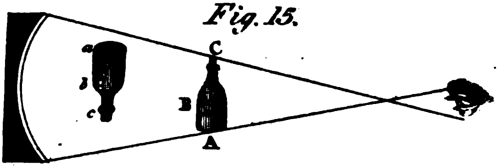


Fig. 15.



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DIVISION of the SUBJECT.

(7.) As this ſubject naturally recurs under the general ſcience, OPTICS, it is ſufficient to give under this article,

I. Some definitions of terms, together with the principle upon which all mathematical reaſoning reſpecting this ſubject is founded.

II. A ſummary account of the concluſions deduced from that principle, relating to the reflection of light from *plane*, *concave*, and *convex mirrors*; and

III. A few entertaining experiments, founded on theſe concluſions.

SECT. I. DEFINITIONS of TERMS, and GENERAL PRINCIPLE of the SCIENCE.

(8.) I. Every poliſhed body that reflects the rays of light is called a MIRROR or SPECULUM. They may be of various forms, but there are three kinds principally uſed in catoptrical experiments: viz. I. The PLANE MIRROR, GHI, *Plate* LXII. *fig.* 1. II. The SPHERICAL CONVEX MIRROR, GHI, *fig.* 2. and, III. The SPHERICAL CONCAVE MIRROR, GHI *fig.* 3 and 4.

(9.) II. The centre of a ſphere, whoſe concave, or convex ſurface, forms the reflecting ſurface of a mirror, is called the CENTRE of that mirror; thus K is the centre of the concave mirror, *fig.* 3. or of the convex mirror, *fig.* 2.

(10.) III. A line K H drawn from the centre of a concave or convex mirror, perpendicular to its reflecting ſurface, is called the AXIS of the mirror; and the point H, where the axis meets the ſurface, is called its VERTEX.

(11.) IV. The PRINCIPAL FOCUS of a ſpherical reflecting mirror is a point in its axis, equally diſtant from the centre and the vertex.

(12.) V. The ANGLE OF INCIDENCE is the angle made by an incident ray, and the perpendicular to that point of the ſurface on which the ray falls; and,

(13.) The ANGLE OF REFLECTION is the angle contained by the reflected ray and the ſame perpendicular.

(14.) Thus in *fig.* 20, let D E be any reflecting ſurface to which F C is a perpendicular at the point C, let A C be an incident ray, and C B the correſponding reflected ray. The angle A C F is called the angle of incidence, and B C F the angle of reflection.

(15.) The whole doctrine of catoptrics is founded on this ſimple principle which is a law of nature, that the angle of incidence is in all caſes equal to the angle of reflection.

(16.) The truth of this law is founded upon no particular hypotheſis concerning the nature of light. It is merely matter of experience, and has been found to take place in every caſe that has fallen under obſervation; at leaſt as nearly as mechanical meaſurements can aſcertain.

(17.) It is worthy of remark, that by this law of nature, a ray of light paſſing from a given point A, to another given point B, *fig.* 20, by being reflected from a plane, or from a convex ſurface, at the point C, will have the length of its rout, or the ſum of the lines A C and C B, the ſhorteſt poſſible. This obſervation, however, does not univerſally apply to reflection from all ſurfaces.

SECT. II. CONCLUSIONS deduced from the GENERAL PRINCIPLE, Reſpecting the REFLECTION of LIGHT.

(18.) FROM the principle explained in the laſt ſection, (15—17.) and the common properties of lineal geometry, the chief phænomena relative to the reflection of light from mirrors, may be accounted for. Theſe are as follow.

I. PHÆNOMENA of a PLANE MIRROR.

(39.) I. Rays of light reflected from a plane ſurface have the ſame inclination to each other after reflection, that they had before it.

(20.) Thus if AC and AG be rays iſſuing from the radiant point A, *fig.* 20. and reflected by the ſurface DE into the lines CB, GK, theſe lines, if produced to H, will contain an angle BHK equal to the angle CAG.

(21.) II. The image, DF, *fig.* 1. will appear as far behind the mirror as the object, AC, is before it.

(22.) III. The image will appear of the ſame ſize, and in the ſame poſition as the object.

(23.) IV. Any plane mirror will reflect an image of twice its own length and breadth.

II. PHÆNOMENA of a SPHERICAL CONVEX MIRROR, *fig.* 2.

(23) I. The image, DF, will always appear behind the mirror, or within the ſphere.

(25.) II. The image will be in the ſame poſition but leſs than the object, AC.

(26.) III. The image will be curved, but not ſpherical like the mirror.

(27.) IV. Parallel rays falling on this mirror will have the image at half the diſtance of the centre from the mirror.

(28.) V. In converging rays, the diſtance of the object muſt be equal to half the diſtance of the centre, to make the image appear behind the mirror.

(29.) VI. Diverging rays will have their image at leſs than half the diſtance of the centre.

III. PHÆNOMENA of a SPHERICAL CONCAVE MIRROR, *fig.* 3 *and* 4.

(30.) I. Parallel rays have their focus, or the image, at half the diſtance of the centre.

(31.) II. In the centre of the ſphere, the image appears of the ſame dimenſions as the object.

(32.) III. Converging rays form an image before the mirror.

(33.) IV. In diverging rays, if the object be at leſs than half the diſtance of the mirror, the image will be behind the mirror, erect, curved, and magnified, as DEF, *fig.* 3. but if the diſtance of the object be greater, the image will be before the mirror, inverted and dimniſhed, as DEF, *fig.* 4.

(34.) V. The ſolar rays being parallel, will be collected into a focus at half the diſtance of its centre, where their heat will be augmented in proportion as the ſurface of the mirror exceeds that of the focal ſpot.

(35.) VI. If a luminous body be placed in the principal focus of a concave mirror, its rays, being reflected in parallel lines, will ſtrongly enlighten a ſpace of the ſame dimenſions with the mirror at a great diſtance. If the luminous object be placed between the focus and the vertex, its rays will diverge, and ſo enlighten a larger ſpace; but not ſo ſtrongly. Upon this principle Reverberators are conſtructed.

Sect. III. Catoptrical Illusions, *or* Entertaining Experiments, *founded on the* preceding Conclusions.

(36.) Of all our ſenſes the ſight is certainly ſubject to the greateſt deception, and hence the great variety of phænomena which are capable of being exhibited in catoptrics.

(37.) I. Take a glaſs bottle, A *fig.* 14, and fill it with water to the point B: leave the upper part BC, empty, and cork it in the common manner. Place this bottle oppoſite a concave mirror, and beyond its focus, that it may appear reverſed, and before the mirror, place yourſelf ſtill further diſtant from the bottle, and it will appear in the ſituation, *a, b, c, fig.* 15.

(38.) In this apparent bottle, the water, which, according to all the laws of catoptrics, and all the experiments made on other objects, ſhould appear at *a b*, appears on the contrary at *b c*, and conſequently the part *a b* appears empty. If the bottle be inverted and placed before the mirror, as in *fig.* 16, its image will appear in its natural, erect poſition; and the water, which is in reality at BC, will appear at *a b*. If, while the bottle is inverted, it be uncorked, and the water run gently out, it will appear, that while the part BC is emptying, that of *a b* in the image is filling: but what is likewiſe very remarkable, as ſoon as the bottle is empty the illuſion ceaſes, the image alſo appearing entirely empty.

(39.) If the bottle likewiſe be quite full, there is no illuſion. If while the bottle is held inverted, and partly empty, ſome drops of water fall from the bottom A towards BC, it ſeems in the image as if there were formed at the bottom of the part *a b*, bubbles of air that roſe from *a* to *b*: which is the part that ſeems full of water. All theſe phænomena conſtantly appear.

(40.) The remarkable circumſtances in this experiment are, firſt, not only to ſee an object where it is not, but alſo where its image is not; and ſecondly, that of two objects which are really in the ſame place, as the ſurface of the bottle and the water it contains, the one is ſeen at one place, and the other at another; and to ſee the bottle in the place of its image, and the water where neither it nor its image are.

(41.) II. Conſtruct a box, AB, *fig.* 5, of about a foot long, 8 inches wide, and 6 high; or of any other dimenſions, provided they do not greatly vary from theſe proportions. On the inſide of this box, againſt each of its oppoſite ends, A and B, place a mirror of the ſame ſize. Take off the quickſilver from the mirror placed at B, for about an inch and an half, at the part C, where a hole muſt be made in the box of the ſame ſize, by which its inſide may eaſily be viewed. Cover the top of the box with a frame, in which muſt be placed a tranſparent glaſs, covered with gauze, on the two grooves at the parts E and F, to receive two painted ſcenes.

(42.) On two pieces of cut paſteboad let there be ſkilfully painted on both ſides, (ſee *fig.* 6 and 7,) any ſubject; as woods, gardens, &c. and on two other paſteboards, the ſame ſubjects on one ſide only; obſerving that there muſt be on one of them ſome object relative to the ſubject placed at A, that the mirror placed at D may not reflect the hole at C on the oppoſite ſide. Place the two boards painted on both ſides in the grooves E and F; and thoſe that are painted on one ſide only, againſt the oppoſite mirrors C and D; and then cover the box with its tranſparent top.

(43.) This box ſhould be placed in a ſtrong light to have a good effect. When the eye is placed at C, and views the objects on the inſide of the box, of which ſome, as we have ſaid, are painted on both ſides, they are ſucceſſively reflected from one mirror to the other; and if, for example, the painting conſiſts of trees, they will appear like a very long viſta, of which the eye cannot diſcern the end: for each of the mirrors repeating the objects, continually more faintly, contribute greatly to augment the illuſion.

(44.) Take a ſquare box, A B C D, *fig.* 8. of about 6 inches long, and 12 high; cover the inſide of it with 4 plane mirrors, which muſt be placed perpendicular to the bottom of the box C H F D. Place certain objects in relief on the bottom of this box; ſuppoſe, for example, a piece of fortification, as *fig.* 9. with tents, ſoldiers, &c. or any other objects that will produce an agreeable effect by their diſpoſition when repeatedly reflected by the mirrors.

(45.) On the top of this box place a frame of glaſs, in form of the bottom part of a pyramid, whoſe baſe, A G E B, is equal to the ſize of the box; its top, I L N, muſt form a ſquare of 6 inches, and ſhould not be more than 4 or 5 inches higher than the box. Cover the four ſides of this frame with gauze, that the inſide may not be viſible but at the top I L N, which ſhould be covered with a tranſparent glaſs.

(46.) Upon looking into this box through the glaſs I L N, the mirrors that are diametrically oppoſite each other, mutually reflecting the figures incloſed, the eye beholds a boundleſs extent, completely covered with theſe objects; and if they are properly diſpoſed, the illuſion will occaſion no ſmall ſurpriſe, and afford great entertainment.

(47.) The nearer the opening I L N is to the top of the box, the greater will be the apparent extent of the ſubject. The ſame will happen if the 4 mirrors placed on the ſides of the box be more elevated. The objects, by either of theſe diſpoſitions, will appear to be repeated 9, 25, 49 times, &c. by taking always the ſquare of the odd numbers of the arithmetical progreſſion 3, 5, 7, 9, &c. as is very eaſy to conceive, if we remember that the ſubject incloſed in the box is always in the centre of a ſquare, compoſed of ſeveral others, equal to that which forms the bottom of the box. Other pieces of the ſame kind, viewed from above, may be contrived, in which mirrors may be placed perpendicular on a triangular, pentagonal, or hexagonal plane.

(48.) All theſe different diſpoſitions, properly directed, with regard to the choice and poſition of the objects, will conſtantly produce very remarkable and pleaſing illuſions. If inſtead of placing the mirrors perpendicular, they were to incline equally, ſo as to form part of a reverſed pyramid,

the

Fig. 16.

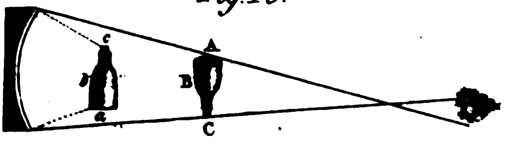


Fig. 18.

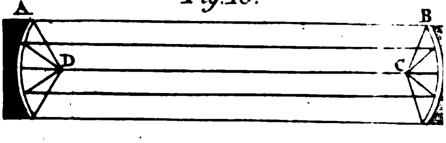


Fig. 17.

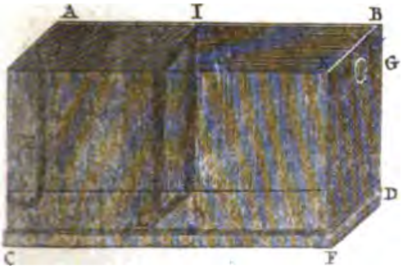


Fig. 19.

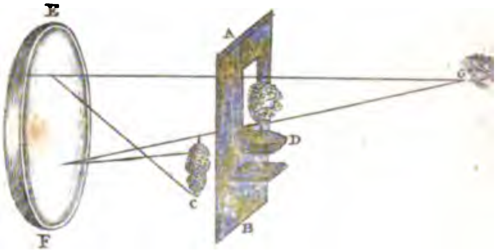


Fig. 21. Chimney.

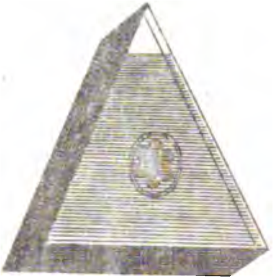


Fig. 20.

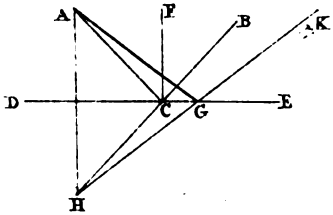


Fig. 22. Circumferentor.

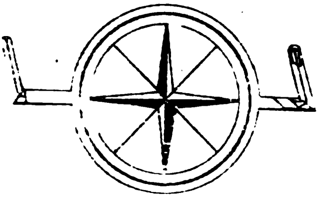
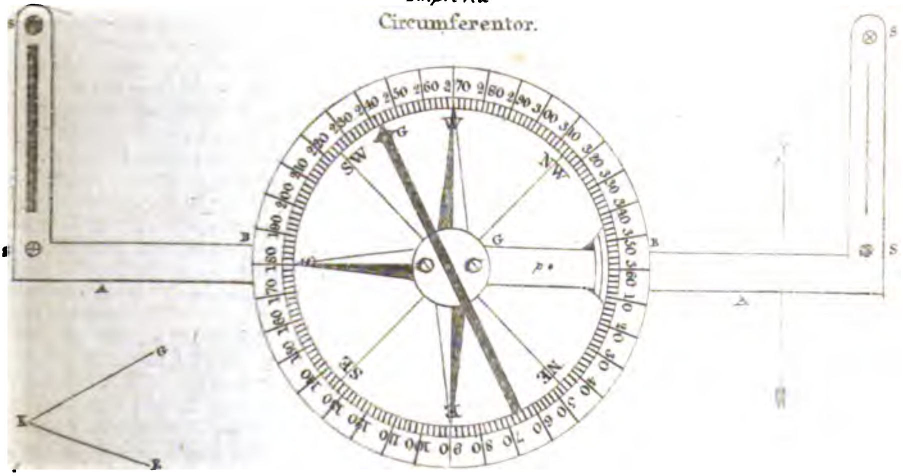


Fig. 23.
Improved
Circumferentor.



Engraved for Encyclopaedia Perthensis.

the ſubject placed in the box would then have the appearance of a very extenſive globular or many-ſided figure.

(49.) IV. On the hexagonal or ſix ſided plane. A B C D E F, *fig.* 10. draw ſix ſemi-diameters GA G B, G C, G D, G E, G F; and on each of theſe place perpendicularly two plain mirrors, which muſt join exactly at the centre G, and which placed back to back muſt be as thin as poſſible. Decorate the exterior boundary of this piece (which is at the extremity of the angles of the hexagon,) with ſix columns, that at the ſame time ſerve to ſupport the mirrors, by grooves formed on their inner ſides. See the profile H. Add to theſe columns their entablatures, and cover the edifice. In each of theſe ſix triangular ſpaces, contained between two mirrors, place little figures of paſteboard, in relief, repreſenting ſuch objects as when ſeen in an hexagonal form will produce an agreeable effect. To theſe add ſmall figures of enamel; and take particular care to conceal, by ſome object that has relation to the ſubject, the place where the mirrors join, which all meet in the common centre G.

(50.) Upon looking into any one of the ſix openings of this palace, the objects there contained being repeated 6 times, will ſeem entirely to fill up the whole of the building. This illuſion will appear very remarkable; eſpecially if the objects made choice of are properly adapted to the effect that is to be produced by the mirrors.

(51.) If part of a fortification, as a curtain and a demi-baſtions, be placed between two of theſe mirrors, there will be ſeen an entire citadel, with its 6 baſtions, or if part of a ball room be placed, ornamented with chandeliers and figures in enamel, all theſe objects being here multiplied, will afford a very pleaſing proſpect.

(52.) V. Within the caſe ABCD, place 4 mirrors, O, P, Q, R, *fig.* 11. ſo diſpoſed that each of them may make an angle of 35 degrees; that is, that they may be half way inclined from the perpendicular, as in the figure. In each of the two extremities AB, make a circular aperture, in one of which fix the tube, GL, in the other the tube MF, and obſerve that in each of theſe is to be inſerted another tube, as H and I.

(53.) Theſe 4 tubes muſt terminate in the ſubſtance of the caſe, and not enter the inſide, that they may not hinder the effect of the mirrors. The fourfold reflection of the rays of light from the mirrors, darkens in ſome degree the brightneſs of the object; ſome light is alſo loſt by the magnifying power of the perſpective, if, therefore inſtead of the object glaſs at G, and concave eye glaſs at F, plain glaſſes be ſubſtituted, the magnifying power of the perſpective will be taken away, and the object will appear brighter.

(54.) Furniſh the firſt of the tubes above-mentioned, (§ 52.) with an object-glaſs at G, and a concave eye glaſs at F. In regulating the focus of theſe glaſſes, with regard to the length of the tube, it muſt be ſuppoſed equal to the line O, or viſual pointed ray, which entering at the aperture G, is reflected by the 4 mirrors, and goes out at the other aperture F, where the ocular glaſs is placed. Put any glaſs into the two ends of the moveable tubes H and I; and laſtly place the machine on a ſtand F, moveable at the point S, that it may be elevated or depreſſed at pleaſure.

(55.) When the eye is placed at F, upon looking through the tube, the rays of light that proceed from the object T, paſſing through the glaſs G, are ſucceſſively reflected by the mirrors O, P, Q, and R, to the eye at F, and theſe paint the object T, in its proper ſituation, and theſe rays appear to proceed directly from that object. The two moveable tubes H and I, at the extremities of each of which a glaſs is placed, ſerve only the more to diſguiſe the illuſion, for they have no communication with the interior part of the machine.

(56.) This inſtrument being moveable on the ſtand E, may be directed to any object; and if furniſhed with proper glaſſes will anſwer the purpoſe of a common perſpective. The moveable tubes H and I being brought together, the machine is directed towards any object, and a perſon being deſired to look in at the end F, may be aſked, if he ſee diſtinctly that object. Then ſeparate the two moveable tubes, and leaving a ſpace between them ſufficient to place your hand, or any other ſolid body, tell him that the machine has the power of making objects viſible through the moſt opaque body; and as a proof deſire him to look at the ſame object, when, to his great ſurpriſe, he will ſee it as diſtinct as when there was no ſolid body placed between the tubes.

(57.) This experiment is the more extraordinary, as it is very difficult to conceive how the effect is produced. The two arms of the caſe appearing to be made to ſupport the perſpective glaſs to whatever object it is directed, the effect is ſtill the ſame.

(58.) VI. No catoptrical illuſion affords more entertainment, than what are called the MAGICIAN'S MIRRORS:—only perſons of weak nerves ought not to be deſired to look into them, at leaſt without previous warning, that the whole is mere deception. In the partition AB, *fig.* 12. make two apertures, CD, and EF, of a foot high, and ten inches wide, and about a foot diſtant from each other. Let them be at the common height of a man's head; and in each of them place a tranſparent glaſs, ſurrounded with a frame like a common mirror. Behind this partition place two mirrors H and I, inclined to it in an angle of 45 degrees; that is, half-way between a line drawn perpendicular to the ground and its ſurface: let them be both 18 inches ſquare: let all the ſpace between them be incloſed by boards or paſteboard painted black, and well cloſed, that no light may enter: let there be alſo two curtains to cover them, which may be drawn aſide at pleaſure.

(59.) When a perſon looks into one of theſe ſuppoſed mirrors, inſtead of ſeeing his own face, he will perceive the object that is in front of the other: ſo that if two perſons preſent themſelves at the ſame time before theſe mirrors, inſtead of each one ſeeing himſelf, they will reciprocally ſee each other. There ſhould be a ſconce with a candle placed on each ſide of the two glaſſes in the wainſcot, to enlighten the faces of the perſons who look into them, otherwiſe this experiment will have no remarkable effect.

(60.) The illuſion in this experiment may be conſiderably improved by placing the two glaſſes in the partition in adjoining rooms; and a number of perſons being previouſly placed in one room, when a ſtranger enters the other, he may be told his face is dirty, and deſired to look in the glaſs, which he will naturally do. On ſeeing a ſtrange face he will draw back; but returning to it, and ſeeing another, and another, like the phantom kings in Macbeth, his ſurpriſe may be eaſily conceived. After this a real-mirror may be privately let down on the back of the glaſs: and if he can be prevailed on to look in it once more, he will then, to his further aſtoniſhment, ſee his own face; and may be told, perhaps perſuaded, that all he ſaw before was mere imagination. How many tricks leſs artful than this, have paſſed in former times for ſorcery; and ſtill paſs in ſome countries, for apparitions?

(61.) When a man looks in a mirror that is placed perpendicular to another, his face will appear entirely deformed, if the mirror be a little inclined ſo as to make an angle of 80 degrees (that is one ninth part from the perpendicular), he will then ſee all the parts of his face, except the noſe and forehead. If it be inclined to 60 degrees (that is, one third part), he will appear with three noſes and ſix eyes: in ſhort, the apparent deformity will vary at each degree of inclination; and when the glaſs comes to 45 degrees (that is, half way down), the face will vaniſh.

(62.) If, inſtead of placing the two mirrors in this ſituation, they are ſo diſpoſed that their junction may be vertical, their different inclinations will produce other effects; as the ſituation of the object relative to theſe mirrors, is quite different. The effects of theſe mirrors, though remarkable enough, occaſions but little ſurpriſe, as there is no method of concealing the cauſe by which they are produced.

(63.) VII. Make a box of wood, of a cubical figure, ABCD, *fig.* 13, of about 15 inches every way. Let it be fixed on the pedeſtal P, at the uſual height of a man's head. In each ſide of this box let there be an opening of an oval form, of 10 inches high, and 7 wide. In this box place 2 mirrors A, D, with their backs againſt each other; let them croſs the box in a diagonal line, and in a vertical poſition. Decorate the openings in the ſides of this box with 4 oval frames and tranſparent glaſſes, and cover each of them with a curtain ſo contrived that they may all draw up together. Place 4 perſons in front of the 4 ſides, and at equal diſtances from the box, and then draw up the curtains, when each of them inſtead of his own figure, will ſee that of the perſon who is next him, and who, at the ſame time, will ſeem to him to be placed on the oppoſite ſide. Their confuſion will be the greater, as it will be very difficult for them to diſcover the mirrors concealed in the box. The reaſon of this phænomenon is evident; for though the rays of light may be turned aſide by a mirror, yet, as we have before ſaid, they always appear to proceed in right lines.

(64.) VIII. Make a box ABCD *fig.* 17, of about two feet long, 15 inches wide, and 12 inches high. At the end AC, place a concave mirror, the focus of whoſe parallel rays is at 18 inches from the reflecting ſurface. At IL, place a paſteboard blacked, in which a hole is cut ſufficiently large to ſee on the mirror H the object placed at BEFD. Cover the top of the box, from A to I, cloſe, that the mirror H may be entirely darkened. The other part IP, muſt be covered with a glaſs, under which is placed a gauze. Make an aperture at G, near the top of the ſide EB; beneath which, on the inſide, place, in ſucceſſion, paintings of different ſubjects, as viſtas, landſcapes, &c. ſo that they may be in front of the mirror H. Let the box be ſo placed that the object may be ſtrongly illuminated by the ſun, or by wax lights placed under the encloſed part of the box AI. By this ſimple conſtruction the objects placed at GD will be thrown into their natural perſpective; and if the ſubjects be properly choſen, the appearance will be altogether as pleaſing, as in optical machines of a much more complicated form.

(65.) In this experiment, a glaſs mirror ſhould always be uſed, as thoſe of metal do not repreſent the objects with equal vivacity, and are beſide ſubject to tarniſh. It is alſo neceſſary that the box be ſufficiently large, that the focus of the mirror uſed may not be too ſhort; for in that caſe, the right lines near the border of the picture will appear bent in the mirror, which will have a diſagreeable effect.

(66.) IX. The rays of a luminous body placed in the focus of a concave mirror being reflected in parallel lines, if a ſecond mirror be placed diametrically oppoſite the firſt, it will, by collecting thoſe rays in its focus, ſet fire to a combuſtible body. Place two concave mirrors, A and B, *fig.* 10, at about 14 or 15 feet diſtance from each other, and let the axis of each of them be in the ſame line. In the focus C of one of them place a live coal, and in the focus D of the other, ſome gunpowder. Keep conſtantly blowing the coal, with a pair of double bellows, which make a continual blaſt, and notwithſtanding the diſtance between them, the powder will inſtantly take fire. It is not neceſſary that theſe mirrors be of metal or braſs; thoſe made of wood or paſteboard, gilded, will produce the exploſion, which has ſometimes taken effect at the diſtance of 50 feet, when mirrors of 18 inches or two feet diameter have been uſed.

(67.) This experiment ſucceeds with more difficulty at great diſtances; doubtleſs owing to the moiſture contained in a large quantity of air. It would no doubt take effect more readily, if a tin tube, of an equal diameter with the mirrors, were placed between them.

(68.) X. Behind the partition AB, *fig.* 19, place, in a poſition ſomething oblique, the concave mirror EF, which muſt be at leaſt ten inches in diameter, and its diſtance from the partition equal to three fourths of the diſtance of its centre. In the partition make an opening of 7 or 8 inches, either ſquare or circular: it muſt face the mirror, and be of the ſame height with it. Behind this partition place a ſtrong light, ſo diſpoſed that it may not be ſeen at the opening, and may illumine an object placed at C, without throwing any light on the mirror. Beneath the aperture in the partition place the object C, that is intended to appear on the outſide of the partition, in an inverted poſition; which we will ſuppoſe to be a flower.

(69.) Before the partition, and beneath the aperture, place a little flower pot D, the top of which ſhould be even with the bottom of the aperture, that the eye, placed at G, may ſee the flower in the ſame poſition as if the ſtalk came out of the pot. Paint the ſpace between the back part of the partition and the mirror black, to prevent any reflections of light from being thrown on the mirror; and to diſpoſe the whole that it may be as little enlightened as poſſible.

(70.) A perſon placed at the point G will perceive the flower that is behind the partition, at the top of the pot at D, but on putting out his hand to pluck it, he will find that he attempts to graſp a ſhadow. If in the opening of the partition a large double convex lens of a ſhort focus be placed, or, (though it is not quite ſo well,) a bottle of clear water, the image of the flower reflected thereon will appear much more vivid and diſtinct.

(71.) Nothing in Catoptrics is more curious and aſtoniſhing than the phenomena that may be produced by means of concave mirrors. By their help, SPECTRES of various kinds may be exhibited. Suppoſe, for example a perſon with a drawn ſword places himſelf before a large concave mirror, but farther from it than its focus; he will ſee an inverted image of himſelf in the air, between him and the mirror, of a leſs ſize than himſelf. If he ſteadily preſent the ſword towards the centre of the mirror, an image of the ſword will come out therefrom, towards the ſword in his hand point to point, as it were to fence with him: and by puſhing the ſword nearer, the image will appear to come nearer him, and almoſt to touch his breaſt, having a ſtriking effect upon him.

(72.) If the mirror be turned 45 degrees, or one eighth round, the reflected image will go out perpendicular to the direction of the ſword preſented, and apparently come to another perſon placed in the direction of the motion of the image. If that perſon is unacquainted with the experiment, and does not ſee the original ſword, he will be much ſurpriſed and alarmed.

(73.) This experiment may be another way diverſified, by telling any perſon, that at ſuch an hour, and in ſuch a place, he ſhould ſee the apparition of an abſent or deceaſed friend. Of this friend's portrait, the inviter muſt be previouſly in poſſeſſion. In order to produce this phantom, inſtead of the hole in the partition AB in the laſt figure, there muſt be a door which opens into an apartment to which there is a conſiderable deſcent. Under that door place the portrait, which muſt be inverted and ſtrongly illuminated, that it may be clearly reflected by the mirror, which muſt be large and well poliſhed. Then having introduced the credulous ſpectator at another door, and placed him in the proper point of view, upon ſuddenly throwing open the door at AB, to his great aſtoniſhment, he will immediately ſee the apparition of his friend.

(74.) It will be objected, perhaps, that this is not a perfect apparition, becauſe it is only viſible at one point of view, and by one perſon. But it ſhould be remembered, that it was long an eſtabliſhed maxim, that a ſpectre might be viſible to one perſon and not to others. Thus Shakeſpeare makes both Hamlet and Macbeth ſee apparitions that were not viſible to others, preſent at the ſame time. And it is not unlikely, that this maxim took its riſe from certain apparitions of this kind, raiſed by the monks, to ſerve their purpoſes; as they alone were in poſſeſſion of what little learning was in the world, in the dark ages.

(75.) Glaſs mirrors are ſometimes ground concave in one direction only, as it is ſaid *longitudinally*. This is in fact a concave portion of a cylinder, the breadth of which may be conſidered that of the mirror. A perſon looking at his face in this mirror, in the direction of its concavity, will ſee it curiouſly diſtorted in a very lengthened appearance; and by turning the CYLINDRICAL MIRROR a quarter round, his viſage will appear diſtorted by an apparent increaſe in breadth only.

(76.) Another curious and ſingular property attends this ſort of mirrors: If in a very near ſituation before it, one puts his finger on the right hand ſide of his noſe, it will appear the ſame in the mirror; but if in a diſtant ſituation, ſomewhat beyond the centre of concavity, he again looks at his face in the mirror, his finger will appear to be removed to the left hand ſide of his noſe. This, though ſomething extraordinary, will in its cauſe appear very evident, from ſlightly conſidering the properties of ſpherical concave mirrors.

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CATOPTROMANCY, [from κατοπτρον, a mirror, and μαντεια, divination,] a kind of divination among the ancients; ſo called becauſe conſiſting in the application of a mirror. Pauſanias ſays, it was in uſe among the Achaians; where thoſe who were ſick, and in danger of death, let down a mirror, faſtened by a thread, into a fountain before the temple of Ceres; then looking in the glaſs, if they ſaw a ghaſtly diſfigured face, they took it as a ſure ſign of death: on the contrary, if the fleſh appeared freſh and healthy, it was a token of recovery. Sometimes glaſſes were uſed without water, and the images of things future repreſented in them. See Gastromancy.

CATOPTRON, an optical glaſs, or mirror.

CATOUCH Cape, the NE. promontory of Yucatan, in Mexico, N. America. Lon. 86. 30. W. Lat. 22. 10. N.

* CATPIPE. *n. ſ.* [from *cat* and *pipe*.] The ſame with *catcal*; an inſtrument that makes a ſqueaking noiſe.—Some ſongſters can no more ſing in any chamber but their own; put them out of their road once, and they are mere *catpipes* and dunces. *L'Eſtrange.*

CATRINE, a village in Ayrſhire, beautifully ſituated on the N. ſide of the river Ayr, in the weſtern extremity of the pariſh of Sorn. It is of a regular, oblong form, and in the middle is a ſquare of 300 feet, with ſtreets leading from it on the E. S. and W. and theſe are interſected with other croſs ſtreets at right angles. This village owes its eſtabliſhment entirely to the cotton manufacture. In 1787, Mr Alexander of Ballochmyle, the proprietor, in partnerſhip with the well known patriotic Mr David Dale of Glaſgow, eſtabliſhed extenſive ſpinning machinery, and built this village for the accommodation of the work people; ſince which time it has increaſed conſiderably, and now contains about 1400 inhabitants. It is 14 miles from the town of Ayr.

CAT-ROPE, in ſhips, the rope that hawls up the Cat.

CATROPITÆ. See Agonistici.

CATROU, Francis, a famous Jeſuit, born at Paris, in 1656. He was engaged for 12 years in the *Journal de Trevoux*. He alſo wrote a Hiſtory of the Mogul empire, and a Roman hiſtory, in which he was aſſiſted by Rouille. Catron died in 1737; and this laſt hiſtory, was continued by Rouille, who died in 1740.

CAT-SALT, a name given by our ſalt workers to a very beautifully granulated kind of common ſalt. It is formed out of the bittern, or leachbrine, which runs from the ſalt when taken out of the pan. When they draw out the common ſalt from the boiling pans, they put it into long wooden troughs, with holes bored at the bottom for the brine to drain out; under theſe troughs are placed veſſels to receive this brine, and acroſs them ſmall ſticks to which the cat-ſalt affixes itſelf in very large and beautiful cryſtals. This ſalt contains ſome portion of the bitter purging ſalt, is very ſharp and pungent, and is white when powdered, though pellucid in the maſs. It is uſed by ſome for the table, but the greateſt part of what is made of it is uſed by the makers of hard ſoap.

(1.) * CATS-EYE. A ſtone.—*Cat's-eye* is of a gliſtering grey, interchanged with a ſtraw colour. *Woodward on Foſſils.*

(2.) Cats-eye. See Sun-stone.

(1.) * CATS FOOT. *n. ſ.* An herb; the ſame with *alehoof*, or *groundivy*; which ſee.

(2.) Cats-foot, in botany. See Glechoma.

(3.) Cats-foot, mountain. See Gnaphalium.

CATSGROVE-HILL, a village in Berwickſhire, near Reading.

CATSHANITZ, a fortreſs of Bulgaria, which defends the paſs over the mountains.

(1.) * CATS-HEAD. *n. ſ.* A kind of apple.—*Cat's-head*, by ſome called the go-no-further, is a very large apple, and a good bearer. *Mortim. Huſb.*

(2.) Cats-head is alſo a name given to a ſort of waſte ſtony lumps, not inflammable, found in coal mines. They have frequently impreſſions of ferns.

(1.) * CAT-SILVER. *n. ſ.* A kind of foſſile.—*Cat-ſilver* is compoſed of plates that are generally plain and parallel, and that are flexible and elaſtick; and is of three ſorts, the yellow or golden, the white or ſilvery, and the black. *Woodward.*

(2.) Cat-silver. See Mica.

CATSLEY, a village in Dorſetſhire.

CATS-PAW, a light breath of wind perceived at a diſtance in a calm, by the impreſſion made on the ſurface of the ſea which ſoon decays.

(1.) * CATS-TAIL. *n. ſ.* 1. A long round ſubſtance, that grows in winter upon nut-trees, pines, &c. 2. A kind of reed which bears a ſpike like the tail of a cat. *Phillips's World of Words.*

(2.) Cats-tail, in botany. See Typha.

CATSTOCK, a village in Dorſetſhire, NW. of Frampton.

CATSTREET, in Suſſex, 10 miles S. of Tunbridge-Wells.

* CATSUP. *n. ſ.* A kind of Indian pickle, imitated by pickled muſhrooms.—

And, for home-bred Britiſh cheer,
Botargo, *catſup*, and cavier. *Swift.*

CATTACK. See CUTTACK.

CATTAL MAGNA, } two villages, in Yorkſh.
CATTAL PARVA, } near Boroughbridge.

CATTARICK, a village near Richmond, in the W. Riding of Yorkſh. ſo named from a *cataraſt* in the Swale near it. It has a bridge over that river, and was a great city in the time of the Romans, one of whoſe high roads croſſed the Swale at this place, on its banks are the foundation of great walls, and a high artificial mount. The city was deſtroyed by the Danes; and Roman coins and urns have been ſince dug up in it.

(1.) CATTARA, } or CATARO, a territory in
(1.) CATTARO, } Lower Dalmatia.

(2.) CATTARO, a very ancient town, and capital of the above territory, formerly called ASCRIVIUM. It is 1200 paces in circumference, and has a caſtle, ſtrong walls, narrow ſtreets, and good houſes; ſituated on a gulf of the ſame name, 25 miles SE. of Raguſa, and 30 W. of Scutan. Lon. 18. 40. E. Lat. 42. 40. N.

(3.) CATTARO, GULF OF, a long crooked bay on the coaſt of Lower Dalmatia, improperly named a *canal*, being an arm of the Adriatic, which extends 18 miles in the country, and forms ſeveral ſmall bays.

CATTEL-CATCHING, *adj. obſ.* Uſing all methods to get rich. *Chauc. Aſh.*

CATTERAL, a village in Lancaſhire.

CATTERLY, near Penrith, Cumberland.

(1.) CATTERTHUN, [*i. e.* Camp Town,] a hill with an ancient Caledonian poſt on it, a few miles NW. of Brechin. "It is (ſays Mr Pennant,) of an oval form, made of a ſtupenduous dike of looſe white ſtones, whoſe convexity, from the baſe within, to that without, is 122 feet. On the outſide a hollow, made by the diſpoſition of the ſtones, ſurrounds the whole. Round the baſe is a deep ditch, and below that about 100 yards, are veſtiges of another, that went round the hill. The area within the ſtony mound is flat; the axis, or length of the oval, is 436 feet, the tranſverſe diameter 200. Near the E. ſide is the foundation of a rectangular building; and on moſt parts are the foundations of others ſmall and circular: all which had once their ſuperſtructures, the ſhelter of the poſſeſſors of the poſt: there is alſo a hollow, now almoſt filled with ſtones, the well of the place."

(2.) CATTERTHUN, BROWN, another fortification, but of inferior ſtrength, near the above, (N° 1.) ſeated on a neighbouring hill, and ſo called from the colour of the ramparts, which are compoſed of earth. It is of a circular form, and conſiſts of various concentric dikes. On one ſide of this riſes a ſmall rill, which, running down the hill, has formed a deep gully. From the ſide of the fortreſs is another rampart, which extends parallel to the rill, and then reverts, forming an additional poſt or retreat. Mr Pennant thinks both theſe were poſts occupied by the Caledonians before their engagement with the celebrated AGRICOLA.

CATTERTON, a town in Yorkſhire, near Belton, and Bilburgh.

CATTERWORTH, near Bowditch, Somerſetſhire.

CATTESFIELD, a village in Suſſex, W. of Cowhurſt.

CATTESHALL, near Godalming, Surry.

CATTHORP, NE. of Hallaton, Leiceſterſhire.

(1.) CATTI, an ancient people of Germany, who inhabited the country, reaching on the E. to the river Sala, and on the N. to Weſtphalia; beſides Heſſe, Wetteravia, and part of the tract on the Rhine, and the banks of the Lohne. The Hercynian foreſt began and ended in their country.

(2.) CATTI. See CATY, N° 3.

(3.) CATTI, or } an ancient people of
CATTIVELLAUNI, } Britain, ſeated in the country which is now divided into the counties of Hertford, Bedford, and Bucks. The name of this people is written in different ways by Greek and Roman authors, being ſometimes called *Caſſi*, *Catieuchlani*, *Catticuchlani*, *Cattidudani*, *Catticludani*, &c. That they were of Belgic origin cannot be doubted, and it is not improbable, that they derived their name *Catti*, from the Belgic, word *Katten*, which ſignifies *illuſtrious* or *noble*, and that the addition of *Vellauni*, which means *on the banks of the rivers*, might be given to them after their arrival in Britain, as deſcriptive of the ſituation of their country. However this be, they were one of the moſt brave and warlike of the ancient Britiſh nations, when Cæſar invaded Britain, and long after. CASSIBELAN, their prince, was made commander in chief of the confederated Britons, not only on account of his own perſonal qualities, but alſo becauſe he was at the head of one of their braveſt and moſt powerful tribes. In the interval, between the departure of Cæſar and the next invaſion under Claudius, the Cattivellauni had reduced ſeveral of the neighbouring ſtates under their obedience; and they again took the lead in oppoſition to the Romans at their ſecond invaſion, under their brave but unfortunate prince CARACTACUS. The country of the Cattivellauni was much frequented and improved by the Romans, after it came under their obedience. See DUROCOBRIVA, SALENÆ, and VERULAMIUM. The territories of the Cattivellauni made part of the Roman province called *Britannia Prima.* See BRITAIN, N° I. § 4.

(1.) * CATTLE. *n. ſ.* [a word of very common uſe, but of doubtful or unknown etymology. It is derived by *Skinner*, *Menage*, and *Spelman*, from *capitalia, quæ ad caput pertinent;* perſonal goods: in which ſenſe *chattels* is yet uſed in our law. *Mandeville* uſes *catele* for *price*.] 1. Beaſts of paſture; not wild nor domeſtick.—And God made the beaſt of the earth after his kind, and *cattle* after their kind, and every thing that creepeth upon the earth after his kind. *Gen.* i. 25. 2. It is uſed in reproach of human beings.—Boys and women are for the moſt part *cattle* of this colour. *Shakeſp.*

(2.) CATTLE is a collective word, implying thoſe quadrupeds, which ſerve either for tilling the ground, or for food to men. They are diſtinguiſhed into large, or black cattle, and ſmall cattle: the former including horſes, bulls, oxen, cows, calves, and heifers; the latter rams, ewes, ſheep, lambs, goats, kids, &c. Cattle are the chief ſtock of a farm.

CATTON, four Engliſh villages, viz. 1. in Derbyſh. near Stafford: 2. in Lonſdalevale, Lancaſh.; 3. NW. of Pocklington; and, 4. SW. of Thirſk; both in Yorkſhire.

CATUL, the ancient name of Kettle.

CATULLUS, Caius Valerius, a Roman poet, born at Verona, A. U. C. 666, and A. A. C. 86. The harmony of his numbers acquired him the eſteem and friendſhip of Cicero, and other great men of his time. Many of his poems, however, abound with groſs obſcenities. He wrote ſatirical verſes againſt Cæſar, who inſtead of reſenting them, heaped favours upon the poet. Catullus, however, lived in poverty; and died in the flower of his age, and the height of his reputation. Joſeph Scaliger, Paſſerat, Muret, and Iſaac Voſſius, have written learned notes on his poems.

CATURCINI. See Bankers, § 4.

CATURIGI, a nation of ancient Gaul, who inhabited the territory, ſince called Ambrunois.

CATURUS, in botany, a genus of the triandria order, belonging to the diœcia claſs of plants.

CATUS, in zoology. See Felis.

CATWADE BRIDGE, a town in Suffolk.

CATWATER, a name of Plymouth harbour.

CATWICK, a town near Hornſey, Yorkſhire.

CATWORTH, Great, } two villages in Huntingdonſhire, near
CATWORTH, Little, }
Spladwick.

CATWYCK, a village of S. Holland, on the German Ocean, near which the only branch of the Rhine that retains its original name, is loſt in the ſands. It is 6 miles N. by W. of Leyden.

(1.) CATY, a money of account, uſed in Java, and ſome of the neighbouring iſlands, amounting to about 19 florins Dutch. In Sumatra, it is a piece of money, worth 6s. 8d.

(2.) Caty, a ſmall weight of 3 grains, whereby the lapidaries of the Eaſt weigh their emeralds.

(3.) Caty, Cati, or Catti, an Eaſt India weight, uſed eſpecially at China, equivalent to 25 ounces, and two drams Engliſh. It is divided into 16 taels, and 100 caties make a pic. It is alſo uſed in Japan, Batavia, and other parts of the Indies, where it weighs more or leſs, according as it contains a greater or leſs number of taels; the caty of Java is equivalent to 20 taels; that of Cambaya, to 27; the caty of Siam is double that of China, and amounts to about 150 lb. French.

CATZ, James, an eminent Dutch civilian, politician, and poet, was born at Browerſhaven, in Zealand, in 1577. He acquired by his pleadings ſuch reputation, that the city of Dort choſe him for its penſionary; as did alſo that of Middleburg. In 1634, he was nominated penſionary of Holland and Weſt Frieſland; and in 1648, he was elected keeper of the ſeal of the ſame ſtate, and ſtadtholder of the fiefs; but ſome time after, he reſigned theſe employments, to enjoy the repoſe which his advanced age demanded. As the poſt of grand penſionary had been fatal to almoſt all thoſe who had enjoyed it, from the beginning of the republic till that time, Catz delivered up his charge on his knees, before the whole aſſembly of the ſtates, weeping for joy, and thanking God for having preſerved him from the inconveniences that ſeemed attached to the duties of that office. But though he wiſhed to ſpend the reſt of his days in repoſe, his patriotiſm led him to comply with the deſire of the ſtate, by going on an embaſſy to England, in the delicate juncture in which the republic ſtood during the protectorate of Cromwell. At his return, he retired to his ſeat at Sorgvliet, where he lived in tranquillity till 1660, when he died. He wrote a great number of poems in Dutch; moſt of which are on moral ſubjects, and ſo eſteemed, that they have been often reprinted.

CATZENELVOGEN, a town and caſtle of Germany, in the late circle of Upper Rhine, which gives name to a county. The river of Maine, and the city of Mentz, with its territories, divide the county into Upper and Lower; the former belongs to Heſſe Darmſtadt, and is called Darmſtadt from its capital; and the latter to Heſſe Reinfields, of which St Goar is the capital. The town of Catzenelvogen lies 28 miles NNW. of Mentz, and has an iron mine near it.

CATZURUS, in old records, a hunting horſe.

(I.) CAVA, a ſmall iſland of Orkney, 2 miles S. from Pomona, and belonging to the pariſh of Orphir. It is about a mile long, and a quarter of a mile broad; and in 1796 was inhabited by 3 families. There is a ruinous chapel on the iſland, and a church yard round it.

(II.) Cava, a conſiderable and populous town of Naples, in the Hither principality. It is ſituated at the foot of Mount Metelian, 16 miles S. of Naples, and 3 W. of Salerno. Lon. 14. 55. E. Lat. 40. 26. N.

(III.) Cava, a trading town of Italy, in the dep. of Upper Po, near the river. Honey and flax are its chief commodities.

(IV.) Cava, in anatomy, the largeſt vein in the body, terminating in the right ventricle of the heart. It is divided into

1. Cava ascendens, and } See Anatomy, *Index*.
2. Cava descendens. }

CAVADO, one of the principal rivers in Portugal, It riſes in Tra-los-montes, below Barcelos, and runs into the ſea.

(1.) CAVAILLON, a town of France, in Venaſſin, which was ſubject to the Pope, before the revolution, but is now incorporated with the republic. It is ſeated in an iſland formed by the river Durance, 20 miles SE. of Avignon. Lon. 5. 17. E. Lat. 43. 52. N.

(2.) Cavaillon, a town on the S. ſide of Hiſpaniola, 9 miles NE. of Cayes, and 15 W. by S. of St Louis. Lat. 18 16. N.

* CAVALCADE. *n. ſ.* [Fr. from *cavallo*, a horſe, Ital.] A proceſſion on horſeback.—

> Your *cavalcade* the fair ſpectators view,
> From their high ſtandings, yet look up to you:
> From your brave train each ſingles out a ray,
> And longs to date a conqueſt from your day.
> *Dryden.*

CAVALCADEUR, or } anciently denoted a
CAVALCADOUR, } riding-maſter, but is
now only applied to a ſort of equerries who have the direction of princes ſtables.

CAVALCANTE, Guido, a nobleman of Florence in the 13th century, who having followed the party of the Guelfs, experienced the changeableneſs of fortune. He ſhowed great ſtrength of mind in misfortunes. He wrote a treatiſe in Italian concerning ſtyle, and ſome verſes which are eſteemed. His poem on *the love of this world*, has been commented on by ſeveral learned men.

(1.) * CAVALIER. *adj.* [from the ſubſtantive.] 1. Gay; ſprightly; warlike. 2. Generous; brave.—The people are naturally not valiant, and not much *cavalier*. Now it is the nature of cowards to hurt, where they can receive none. *Suckling*. 3. Diſdainful; haughty.

(2.) * Cavalier. *n. ſ.* [*cavalier*, Fr.] 1. A horſeman; a knight. 2. A gay ſprightly military man.

For who is he, whoſe chin is but enrich'd
With one appearing hair, that will not follow
Theſe cull'd and choice drawn *cavaliers* to
France? *Shak*.

3. The appellation of the party of king Charles the Firſt.—Each party grows proud of that appellation, which their adverſaries at firſt intend as a reproach: of this ſort were the Guelfs and Gibelines, Huguenots, and *Cavaliers*. *Swift*.

(3.) Cavalier, § 1. *def.* 3. See England, history of.

(4.) Cavalier, in fortification, an elevation of earth of different ſhapes, ſituated ordinarily in the gorge of a baſtion, bordered with a parapet, and cut into more or fewer embraſures, according to its capacity. Cavaliers are a double defence for the faces of the oppoſite baſtion: they defend the ditch, break the beſiegers galleries, command the traverſes in dry moats, ſcour the ſaliant angle of the counterſcrap, where the beſiegers have their counter batteries, and enfilade the enemies trenches, or oblige them to multiply their parallels. They are likewiſe very ſerviceable in defending the breach and the retrenchments of the beſieged, and can very much incommode the entrenchments which the enemy make, being lodged in the baſtion.

(1.) CAVALIERI, an iſland in the Archipelago, between the SW. point of the iſland of Negropont, and the continent of Greece. Lon. 24. 17. E. Lat. 38. 7. N.

(2.) Cavalieri, Bonaventure, an eminent mathematician in the 17th century, a native of Milan, and a friar of the order of the Jeſuati of St Jerome, was a profeſſor of mathematics at Bologna, where he publiſhed ſeveral mathematical books, particularly the *Method of Indiviſibles*. He was a ſcholar of Galileo. His *Directorium generale Uranometricum* contains great variety of moſt uſeful practices in trigonometry and aſtronomy. His trigonometrical tables in that work are excellent.

* CAVALIERLY. *adv.* [from *cavalier*.] Haughtily; arrogantly; diſdainfully.

CAVALINO, a village of Italy, in the late Dogado of Venice, and Auſtrian diſtrict of Torcella.

(1.) CAVALLO, a mountain of Italy, in Friuli.

(2.) Cavallo, a ſea-port of Terra Firma, in the province of Venzuela, 25 miles NE. of St Jago de Leon. Lon. 68. 12. W. Lat. 10. 15. N.

(1.) * CAVALRY. *n. ſ.* [*cavaliere*, Fr.] Horſe troops; bodies of men furniſhed with horſes for war.—If a ſtate run moſt to gentlemen, and the huſband and plowmen be but as their workfolks, you may have a good *cavalry*, but never good ſtable bands of foot. *Bacon*.

(2.) Cavalry, ancient. The Roman cavalry conſiſted wholly of equites, or knights. The Grecian cavalry were divided into *cataphractæ* and *non-cataphractæ*, i. e. into heavy and light armed. Of all the Greeks, the Theſſalians excelled moſt in cavalry. The Lacedemonians, inhabiting a mountainous country, were but meanly furniſhed with cavalry, till, carrying their arms into other countries, they found great occaſion for horſes to ſupport and cover their foot. The Athenian cavalry, for a conſiderable time, conſiſted only of 96 horſemen: after expelling the Perſians out of Greece, they increaſed the number to 300; and afterwards to 1200, which was the higheſt pitch of the Athenian cavalry.

(3.) Cavalry, modern. The Turkiſh cavalry conſiſts partly of Spahis, and partly of horſemen raiſed and maintained by the Zaims and Timariots. The chief uſe of the cavalry is to make frequent excurſions to diſturb the enemy, intercept his convoys, and deſtroy the country: in battle to ſupport and cover the foot, and to break through and diſorder the enemy; alſo to ſecure the retreat of the foot. Formerly, the manner of the fighting of the cavalry was, after firing their piſtols or carabines, to wheel off, to give opportunity for loading again. Guſtavus Adolphus is ſaid to have firſt taught the cavalry to charge through, to march ſtraight up to the enemy, with the ſword drawn in the bridlehand, and each man having fired his piece, at the proper diſtance, to betake himſelf to his ſword, and charge the enemy as was found moſt advantageous.

(1.) CAVAN, a county of Ireland, in the province of Ulſter, 42 miles long, and 24 broad; bounded on the W. by Leitrim; on the N. by Fermanagh; on the E. by Monaghan, Louth, and Eaſt Meath; and on the S. by Weſt Meath and Longford. It contains upwards of 8000 houſes, 37 pariſhes, 7 baronies, and 2 boroughs: viz. Cavan, (N° 2.) and Kilmore. It is populous, and carries on the linen manufacture; the annual average of which is eſtimated at 68,200 l. In ſends two members to parliament.

(2.) Cavan, the capital of the above county, (N° 1.) 54 miles NW. of Dublin. Lon. 7. 9. W. Lat. 54. 4. N.

CAVANELLO, a populous town of Italy, on the Adige, in the Dogado and diſtrict of Chioggia.

(1.) CAVARZERE, a fertile diſtrict of the late Maritime diviſion of Auſtria, in the Dogado, bounded on the N. by the Paduano, on the S. by the Poleſine, and W. by Adria; containing 6 pariſhes, ſeveral villages, and 11,000 ſouls.

(2.) Cavarzere, a large and rich town in the above diſtrict, anciently called Cape of Argine, containing 7000 inhabitants, who carry on a profitable trade.

CAVASO, a village of the late Maritime Auſtria, in the territory of Treviſo, and pretorſhip of Aſolo. It has conſiderable woollen and ſilk manufactures.

* *To* CAVATE. *v. a.* [*cavo*, Lat.] To hollow out; to dig into a hollow.

* CAVAZION. *n. ſ.* [from *cavo*, Lat.] In architecture.] The hollowing or underdigging of the earth for cellarage; allowed to be the ſixth part of the height of the whole building. *Phillips*.

CAUB, a town of Germany, in the palatinate of the Rhine. It has 4 caſtles, and ſtands on the E. bank of the Rhine, 2 miles N. by E. of Bacharach.

CAUCA, a river of the Iſthmus of Darien, which riſes from lake Papos, and falls into the Magdalena, in Lat. 8. 0. S.

CAUCALIS, in botany, BASTARD PARSLEY, a genus of the digynia order, belonging to the pentandria claſs of plants; and ranking, according to the natural method, under the 45th order, *Umbellatæ*.

(1.) CAUCASUS, a very high mountain of Aſia, being the principal one of the great ridge. See N° 2. Sir John Chardin deſcribes this as the higheſt mountain, and the moſt difficult to paſs, of any he had ſeen. It has frightful precipices, and in many places the roads are cut out of the ſolid rock. At the time he paſſed it, the mountain was entirely covered with ſnow; ſo that, in many places, his guides were obliged to clear the way with ſhovels. The mountain is 36 leagues over, and the ſummit 8 leagues broad. The top is perpetually covered with ſnow; and Chardin relates, that the two laſt days he ſeemed to be in the clouds, and was not able to ſee 20 paces before him. The other parts, however, are extremely fruitful. See N° 2.

(2.) CAUCASUS is alſo the common name of that great ridge of mountains which extend between the Caſpian and the Black ſeas. Theſe mountains make a curve near Aſtracan, and directing their courſe towards the eaſtern ſhore of the Caſpian, fall off near the mouth of the Jaik, where they become ſecondary mountains, being diſpoſed in ſtrata. As they are an inexhauſtible magazine of combuſtible ſubſtances, they contain an aſtoniſhing quantity of metals. Along the foot of this immenſe chain, we ſometimes meet with warm ſprings, ſometimes ſprings of naphtha of different qualities; (ſee CASPIAN;) ſometimes we find native ſulphur, mines of vitriol, or lakes heated by internal fires. Theſe mountains excepting the tops, which are always covered with ſnow are very fertile; abounding in corn, wine, honey, gum, fruits, hogs, and large cattle. The vines twine about the trees, and riſe ſo high, that the inhabitants cannot gather the fruit from the uppermoſt branches. They are inhabited by 7 different nations; viz. the Abkhas, Circaſſians, Georgians, Kiſti, Leſguis, Oſſi, and Tartars; who all ſpeak different languages. See theſe articles. They have many ſtreams of excellent water, and a vaſt number of towns and villages. The inhabitants are for the moſt part Chriſtians of the Georgian Church. They have fine complexions, and the women are very beautiful. In winter they wear ſnow ſhows in the form of rackets, which prevent their ſinking in the ſnow, and enable them to run upon it with great ſwiftneſs.

(3.) CAUCASUS, one of the 41 governments into which the Ruſſian empire has been lately divided. It is ſubdivided into two provinces; viz. ASTRACAN, (which ſee,) and CAUCASUS. See N° 4.

(4.) CAUCASUS, one of the two provinces above-mentioned, (N° 3.) compriſes the Cuban, and all that diſtrict to the E. and S. now in the poſſeſſion of Ruſſia, between the rivers Don and Cuban, and between the Black Sea and the Caſpian; extending as far as the confines of Georgia, and continually augmenting by the reduction and ſubmiſſion of the wandering hordes of Mount Caucaſus.

CAUCII NUMMI, a kind of baſe coin, current under the lower empire; made concave like a cup.

CAUCON, in botany, a name uſed by Pliny for the plant called horſe-tail. See EQUISETUM.

CAUDA EQUINA. See ANATOMY, *Index*.

(1.) CAUDEBEC, a rich, populous, and trading town of France, in the department of Lower Seine, and ci-devant province of Normandy. It is ſeated at the foot of a mountain near the river Seine, 18 miles NW. of Rouen. Lon. 1. 26. E. Lat. 49. 31. N.

(2.) * CAUDEBECK. *n. ſ.* A ſort of light hats, ſo called from a town in France where they were firſt made. *Phillips*.

CAUDECOSTE, a town of France, in the department of Gers, and ci-devant province of Armagnac.

CAUDEX, by Malpighi and others, is uſed for the ſtem or trunk of a tree: by Linnæus for the body of the root, part of which aſcends, part deſcends. See BOTANY, *Index* and *Gloſſary*. Linnæus conſiders trees and ſhrubs as roots above ground; an opinion which is confirmed by a well known fact, that trees, when inverted, put forth leaves from the deſcending caudex, and radicles or roots from the aſcending. See RADIX.

CAUDIEZ, a town of France, in the ci-devant province of Languedoc.

CAUDINÆ FURCÆ, or CAUDINÆ FURCULÆ, ſpears diſpoſed in the form of a gallows, under which priſoners of war were made to paſs. They gave name to a narrow paſs near CAUDIUM, where the Samnites obliged the Roman army and the two conſuls to lay down their arms and paſs under the gallows, or yoke, as a token of ſubjection.

CAUDIUM, in ancient geography, a town of Samnium, on the Via Appia, between Calatia and Beneventum. The people were called Caudini.

* CAUDLE. *n. ſ.* [*chaudeau*, Fr.] A mixture of wine and other ingredients, given to women in childbed, and ſick perſons.—He had good broths, *caudle*, and ſuch like; and I believe he did drink ſome wine. *Wiſeman's Surgery*.

* *To* CAUDLE. *v. a.* [from the noun.] To make caudle; to mix as caudle.—

Will the cold brook,
Candied with ice, *caudle* thy morning taſte,
To cure thy o'ernight's ſurfeit? *Shak. Timon*.

CAUDLE-GREEN, a village in Glouceſterſhire.

(1.) CAVE, Dr William, a learned Engliſh divine, born in 1637, educated in St John's college, Cambridge, and ſucceſſively miniſter of Haſely in Oxfordſhire, All-hallows in London, and Iſlington. He became chaplain to Charles II. and in 1684 was inſtalled a canon of Windſor. He compiled *the Lives of the Primitive Fathers in the three firſt centuries of the church*, eſteemed a very uſeful work; and *Hiſtoria Literaria*, &c. in which he gives an exact account of all who had written for or againſt Chriſtianity, from the time of Chriſt to the 14th century: which works produced a warm controverſy between Dr Cave and M. Le Clerc, who was then writing his *Bibliotheque Univerſelle* in Holland, and who charged the doctor with partiality. Dr Cave died in 1713.

(2.) **Cave**, Edward, printer, celebrated as the projector of the *Gentleman's Magazine*, the firſt publication of the kind in England, was born in 1691. His father was a ſhoemaker at Rugby in Warwickſhire. After paſſing ſome time at the free ſchool of this place, where he evidenced much ſuperiority of genius, he was placed with a collector of exciſe: but the inſolence of his miſtreſs, who employed him in ſervile drudgery, diſguſted him, and he went up to London in queſt of more ſuitable employment. He was recommended to a timber-merchant on trial, and while he was with him, is ſaid to have given hopes of great mercantile abilities: but this place he ſoon left, and was bound apprentice to Mr Collins, a printer of ſome reputation. This was a buſineſs for which men were formerly qualified by a literary education, and which was pleaſing to Cave, becauſe it furniſhed employment for his ſcholaſtic attainments. Here, therefore, he reſolved to ſettle, though, as his maſter and miſtreſs lived in perpetual diſcord, their houſe was no comfortable habitation. From this inconvenience he was ſoon releaſed, having within only two years attained ſo much ſkill in his art, and gained ſo much confidence of his maſter, that he was ſent to conduct a printing-houſe at Norwich, and publiſh a weekly paper. In this undertaking he met with ſome oppoſition, which produced a public controverſy, and procured young Cave the reputation of a writer. His maſter died before his apprenticeſhip was expired, and not being able to bear the perverſeneſs of his miſtreſs, he quitted her houſe upon a ſtipulated allowance, and married a young widow with whom he lived at Bow. When his apprenticeſhip was over, he worked as a journeyman at the printing houſe of Mr Barber, a man much employed by the Tories, whoſe principles had at that time ſo much prevalence with Cave, that he was for ſome years a writer in *Miſt's Journal*. He afterwards obtained by his wife's intereſt a place in the poſt-office; but ſtill continued, at his intervals of attendance, to exerciſe his buſineſs, He corrected the *Gradus ad Parnaſſum*: and was literally rewarded by the company of ſtationers. He wrote an Account of the Criminals, which had a conſiderable ſale; and publiſhed many little pamphlets that accident brought into his hands, of which it would be difficult to recover the titles. By the correſpondence which his place in the poſt-office facilitated, he procured a country newſpaper, and ſold its intelligence to a journaliſt in London for a guinea a week. He was afterwards raiſed to the office of clerk of the franks, in which he acted with great ſpirit and firmneſs; and often ſtopped franks, given by members of parliament to their friends, becauſe he thought ſuch extenſion of a peculiar right illegal. This raiſed many complaints; and the influence exerted againſt him pocured his ejectment from office. He had now, however, collected a ſum ſufficient for the purchaſe of a ſmall printing-office, and began *the Gentleman's Magazine*; an undertaking to which he owed the affluence in which he paſſed the laſt 20 years of his life, and the large fortune which he left behind him. When he formed the project, he was far from expecting the ſucceſs which attended it; and others had ſo little proſpect of its conſequence, that though he had for ſeveral years talked of his plan among printers and bookſellers, none of them thought it worth the trial. Cave now began to aſpire to popularity; and being a great lover of poetry, he offered ſubjects for poems, and propoſed prizes for the beſt performers. The firſt prize was 50 l. for which he expected the firſt authors of the kingdom to appear as competitors; and offered the allotment of the prize to the univerſities. But when the time came, no name was ſeen among the writers that had been ever ſeen before; and the univerſities rejected the province of aſſigning the prize. The determination was then left to Dr Cromwell Mortimer and Dr Birch; and by the latter the award was made, which may be ſeen in *Gent. Magaz.* Vol. VI. p. 59. Mr Cave continued to improve his Magazine, and had the ſatisfaction of ſeeing its ſucceſs proportionate to his diligence, till, in 1751, his wife died of an aſthma. In a few days he loſt his ſleep and his appetite, which he never recovered. After having lingered about two years, he fell into a diarrhœa, and afterwards into a kind of lethargic inſenſibility; and died Jan. 10, 1754, having juſt concluded the 23d vol. of his Magaz.

(3.) * **Cave.** *n. ſ.* [*cave*, Fr. *cavea*, Lat.] 1. A cavern; a den; a hole entering horizontally under the ground; a habitation in the earth.—They did ſquare, and carve, and poliſh their ſtone and marble works, even in the very *cave* of the quarry. *Wotton.* 2. A hollow; any hollow place. Not uſed.—The object of ſight doth ſtrike upon the pupil of the eye directly; whereas the *cave* of the eye doth hold off the ſound a little. *Bacon.*

(4.) **Cave**, in geography, a town in Devonſhire, near Bampton.

(5.) **Cave, Dropping**, or the **White Cave of Slains**, a remarkable cave in Aberdeenſhire, which the rev. Mr Farquhar thus deſcribes:—"It is viſited by moſt ſtrangers, being juſtly eſteemed a rarity. The ſea reaches to the mouth of it at high water. Upon entering, one ſees the water oozing through a ſpungy porus rock on the top and ſides: it falls down in pretty large drops, like a very moderate ſhower. Theſe drops are of a remarkably petrifying nature. They gradually and imperceptibly line the cave with curious ſtalactical incruſtations, in very different and ſtrange forms. A great deal of theſe was taken out ſome years ago, and turned into lime. It is again petrified all over, and has the look of white marble."

(6.) **Cave, North,** } two villages, N. of the
(7.) **Cave, South,** } Humber, Yorkſhire.

(8.) **Caves**, (§ 3.) were undoubtedly the primitive habitations, before men began to build edifices above ground. See **Architecture**, *Index*. The primitive method of burial was alſo to depoſite the bodies in caves, which ſeems to have been the origin of **Catacombs**. They were long the proper habitations of ſhepherds. Among the Romans, they uſed to be conſecrated to nymphs, who were worſhipped in caves, as other gods were in temples. The Perſians alſo worſhipped their god Mithras, in a natural cave, conſecrated for the purpoſe by Zoroaſter. The cave of the nymph, Egeria, is ſtill ſhown at Rome. Kircher enumerates divers ſpecies of caves; as divine, natural, &c. Of natural caves ſome are poſſeſſed of a medicinal virtue, as the Grotto de Serpente; others are poiſonous or mephitical; ſome are replete with metalline exhalations, and others with waters. Divine caves were ſaid to affect the human mind and paſſions variouſly, and to inſpire a knowledge of future events. Such were the ſacred caverns at Delphi which inſpired the Pythia; the Sibyl's cave at Cumæ, ſtill ſhown near the lake Avernus; the cave of Trophonius, &c.

* *To* CAVE. *v. a.* [from the noun.] To dwell in a cave.—

Such as we
Cave here, haunt here, are outlaws. *Shakeſp.*

CAVEA, in antiquity, 1. The place in the ancient theatres where the ſpectators ſat, divided like that of the modern, into three parts; only the women ſat in the uppermoſt. 1. The middle part in the amphitheatres, called alſo ARENA.

CAVEÆ. See CAGE, § 4.

(1.) * CAVEAT. *n. ſ.* [*caveat*, Lat. *let him beware.*] Intimation of caution.—A *caveat* is an intimation given to ſome ordinary or eccleſiaſtical judge by the act of men, notifying to him, that he ought to beware how he acts in ſuch or ſuch an affair. *Ayliffe.*

(2.) CAVEAT, in law, is uſed to ſtop the proving of a will, the granting tithes of adminiſtration, &c. to the prejudice of another.

CAVEATING, in fencing, is the ſhifting the ſword from one ſide of that of the adverſary to the other.

CAVEDO, in commerce, a Portugueſe long meaſure, equal to $27\frac{177}{1000}$ Engliſh inches.

CAVEHURST, a village in Hampſhire, near King's Clere.

(1.) CAVENDISH, a town in Suſſex, between Long Melford and Clare.

(2.) CAVENDISH, Margaret, Duches of Newcaſtle. See LUCAS.

(3.) CAVENDISH, Sir William, deſcended of an ancient family, was born about 1503. Having had a liberal education, he was taken into the family of cardinal Woolſey, whom he ſerved as gentleman uſher of the chamber, when that proud prelate maintained the dignity of a prince. In 1527, he attended his maſter on his ſplendid embaſſy to France, returned with him to England, and was one of the few who continued faithful to him in his diſgrace. He was with him when he died, and delayed going to court till he had performed the laſt duty of a faithful ſervant, by ſeeing his body decently interred. The king was ſo far from diſapproving of his fidelity, that he immediately took him into his houſehod, made him treaſurer of his chamber, a privy-counſellor, and a knight. In 1540, he was nominated one of the auditors of the court of augmentations, and ſoon after obtained a grant of ſeveral lordſhips in Hertfordſhire. In the reign of Edward VI. his eſtates were much increaſed by royal grants in 7 different counties; and he continued in favour during the reign of Mary I. He died in 1557. He was the founder of Chatſworth, and anceſtor of the dukes of Devonſhire. He wrote *The life and death of cardinal Woolſey:* London 1667; reprinted in 1706.

(4.) CAVENDISH, Thomas, of Suffolk, the ſecond Engliſhman that ſailed round the globe, was deſcended from a noble family in Devonſhire. Having diſſipated his fortune, he reſolved to repair it at the expence of the Spaniards. He ſailed from Plymouth with two ſmall ſhips in July 1586; paſſed through the ſtraits of Magellan; took many rich prizes along the coaſt of America, particularly the St Ann, an Acapulca ſhip, with a cargo of immenſe value. He completed the circumnavigation of the globe, by returning home round the Cape of Good Hope, and reached Plymouth again in September 1588. On his arrival, it is ſaid, his ſoldiers and ſailors were clothed in ſilk, his ſails were damaſk, and his topmaſt was covered with cloth of gold. His acquired riches did not laſt long: he reduced himſelf, in 1591, to the expedient of another voyage; in which he went no farther than the ſtraits of Magellan, where the weather obliging him to return, he died of grief on the coaſt of Brazil.

(5.) CAVENDISH, William, duke of Newcaſtle, grandſon of Sir William (N° 3.) was born in 1592. In 1610, he was made knight of the bath; in 1620, created baron Ogle, and viſcount Mansfield; and in 1628, earl of Newcaſtle, and baron Cavendiſh. He was after this made governor to the prince of Wales, afterwards Charles II. When the troubles broke out in Scotland, and the king's treaſury was low, he contributed L 10,000, and raiſed a troop of horſe, conſiſting of about 200 knights and gentlemen, who ſerved at their own charge, were commanded by the earl, and entitled *the prince's troop.* He afterwards raiſed an army of 8000 horſe, foot, and dragoons; with which he took ſome towns, and gained ſeveral victories. On this he was created Marquis of Newcaſtle; but the king's affairs being ruined by the raſhneſs of prince Rupert, he went abroad, and ſtaid for ſome time at Paris; where his circumſtances were ſo bad, that he and his wife, (N° 2.) were obliged to pawn their clothes for a dinner. He afterwards removed to Antwerp, where, notwithſtanding his diſtreſs, he was treated, during an exile of 18 years, with extraordinary marks of diſtinction. On his return at the reſtoration, he was created earl of Ogle and duke of Newcaſtle. He ſpent his time in a country retirement, was the patron of men of merit, and died in 1679, aged 84. He wrote a treatiſe *on Horſemanſhip*, which is eſteemed; and 4 comedies, viz. *The Country Captain; Variety; The Humorous Lovers*, acted with applauſe in 1677; and *the Triumphant Widow.*

(6.) CAVENDISH, William, the firſt duke of Devonſhire, and one of the moſt diſtinguiſhed patriots in the Britiſh annals, was born in 1640. He was deſcended from Sir John Cavendiſh, who, in 1381, killed Wat Tyler. In 1677, being member for Derby, he vigorouſly oppoſed the meaſures of the court; and in 1678, was one of the committee appointed to draw up articles of impeachment againſt the lord treaſurer Danby. In 1679, being re-elected for Derby, Charles II. made him a privy counſellor; but he ſoon withdrew from the board, with his friend lord Ruſſel, when he found that popiſh intereſt prevailed. He carried up the articles of impeachment up to the houſe of lords againſt lord chief juſtice Scroggs, for his arbitrary and illegal proceedings in the court of King's Bench; and when the king refuſed to ſign the bill for excluding the Duke of York, he moved the houſe, that a bill might be brought in for the aſſociation of all his majeſty's proteſtant ſubjects. He alſo voted for an addreſs, to remove the king's evil counſellors, from his preſence and councils for ever. He nobly appeared at lord Ruſſel's trial, in defence of that great man, at a time when it was ſcarce more criminal to be an accomplice than a witneſs for him. The ſame fortitude, activity, and love of his country, animated this illuſtrious patriot to oppoſe the arbitrary proceedings of James II.; and, when he ſaw there was no other method of ſaving the nation from impending ſlavery, he was the foremoſt for inviting over the prince of Orange, and the firſt nobleman who appeared in arms to receive him at his landing. He was created Duke of Devonſhire in 1694, by William and Mary. His laſt public ſervice was in the union with Scotland, for concluding of which he was appointed a commiſſioner by queen Anne. Beſides his public virtues, he was diſtinguiſhed by his literary accompliſhments. He had a poetical genius, which ſhowed itſelf particularly in two pieces, written with equal dignity, and delicacy: viz. an ode on the death of queen Mary; and an alluſion to the abp. of Cambray's ſupplement to Homer. He died in 1707, and juſtly merited the character inſcribed on his monument;

"Of good princes the faithful ſubject;
"The enemy and averſion of tyrants."

CAVERLEIGH, a town in Devonſhire, SW. of Tiverton.

* CAVERN. *n. ſ.* [*caverna*, Lat.] A hollow place in the ground.—

Where wilt thou find a *cavern* dark enough
To maſk thy monſtrous viſage? *Shak.*

* CAVERNED. *adj.* [from *cavern.*] 1. Full of caverns; hollow; excavated.—

High at his head from out the *cavern'd* rock,
In living rills a guſhing fountain broke. *Pope.*

2. Inhabiting a cavern.—

No bandit fierce, no tyrant mad with pride,
No *cavern'd* hermit, reſt ſelf-ſatisfied. *Pope.*

CAVERNOSA CORPORA. See ANATOMY, § 312.

* CAVERNOUS. *adj.* [from *cavern.*] Full of caverns.—No great damages are done by earthquakes, except only in thoſe countries which are mountainous and conſequently ſtony and *cavernous* underneath. *Woodward's Nat. Hiſtory.*

CAVERS, a pariſh of Scotland, in Roxburghſhire, 10 miles long, but very irregular in breadth, being from 2 to 7 broad. The upper parts are hilly, and feed about 1200 ſheep; the breed of which is of late much improved; the lower are very fertile, producing good crops of wheat, oats, barley and peaſe. The population in 1794, ſtated by the rev. Mr Elliot, in his report to Sir J. Sinclair, was about 1300, and had increaſed 307, ſince 1755. The late gallant lord Heathfield was born in this pariſh. See ELIOTT.

CAVERSFIELD, a village in Bucks, N. of Biceſter in Oxfordſhire.

CAVERSHAM, 2 m. N. of Reading, Oxfordſh.

CAVERY, or CAUVERY, a conſiderable river of Hindooſtan, which riſes among the Gauts, takes a SE. direction through Myſore, and after watering Seringapatam and Tanjore, falls into the Bay of Bengal, by ſeveral mouths, between Cuddalore and Tritchinopoly.

CAVESHAM, a village in Suffolk, between Bury and Milden Hall.

* CAVESSON. *n. ſ.* [Fr. In horſemanſhip.] A ſort of noſeband, ſometimes made of iron, and ſometimes of leather or wood; ſometimes flat, and ſometimes hollow or twiſted; which is put upon the noſe of a horſe, to forward the ſuppling and breaking of him.—An iron *caveſſon* ſaves and ſpares the mouths of young horſes when they are broken; for, by the help of it, they are accuſtomed to obey the hand, and to bend the neck and ſhoulders, without hurting their mouths, or ſpoiling their bars with the bit. *Farrier's Dict.*

CAVET-HOUSE, lies S. of the Swale, Yorkſh.

CAVETTO, an ornament in cornices. See ARCHITECTURE, *Index*, and *Plate* XX.

CAVEZON. See CAVESSON.

* CAUF. *n. ſ.* A cheſt with holes on the top, to keep fiſh alive in the water. *Phillips.*

CAUGHNAWAGO, a town of the United States, in Montgomery county, New York; ſeated S. of the river Mohawk, 30 miles W. by N. of Schenectady, and 206 NNW. of New York city.

* CAUGHT. *particip. paſſ.* [from *To catch*; which ſee.]

CAUHQ-ROY, in natural hiſtory, a foſſile, which the natives of the Eaſt Indies calcine, and give in large doſes in the hic-cough, and other complaints. It is alſo uſed in dyeing. It is a kind of ochre, or clayey iron ore, found in great abundance in the hills. Iron is ſometimes extracted from it.

CAVIA, the CAVY, in zoology, a genus of quadrupeds, belonging to the order of Glires. Mr Kerr, to whom we are chiefly indebted for our account of this genus, (from whoſe *Animal Kingdom*, p. 217—221, we have extracted it,) deſcribes theſe animals as follows. They have two wedge-like cutting teeth in each jaw; 8 grinders in both. The fore feet have 4 or 5 toes; the hind 3, 4, or 5 each. The tail is very ſhort or entirely wanting. The collar bones are wanting. They ſeem to hold a middle place between the murine quadrupeds and the rabbit genus. They have a ſlow and moſtly kind of leaping pace. They never climb trees, but dwell in hollow trees or in burrows, which they dig in the earth; and live on vegetables. There are 7 ſpecies, which Mr Kerr deſcribes in the following order; *Paca*, *Acuſchy*, *Aguti*. *Aperea*, *Cobaya*, *Magellanica*, and *Capybara*; but which we muſt, as uſual, arrange alphabetically.

I. CAVIA ACUSCHY, the *Akouchy* of Buffon, and olive cavy of Pennant, has a ſhort tail; is olive coloured above and whitiſh below. It inhabits Guiana, Cayenne, and Braſil; is about the ſize of a half grown rabbit; is eaſily tamed, and is eſteemed delicate food. The female brings one or two at a litter. It inhabits woods, lives on fruits and abhors water. See *Plate* LXI. *Fig.* 3.

II. Cavia Aguti, the Agouty, has a very ſhort tail, the upper parts are brown, mixed with red and black; the rump, a bright orange, and the belly yellowiſh. See Agouty. Of this ſpecies there are 3 varieties: viz.

1. Cavia Aguti Americana, the American agouti, or American coney of Seba, has external ears, and a very ſhort tail, covered with coarſe reddiſh fur.

2. Cavia Aguti cunicularis, the leſſer agouti, the American wild mouſe of Ray, or long-noſed cavy of Pennant, has a very ſhort tail, 4 toes before, 5 behind, and a yellowiſh belly. It is about the ſize of a rabbit, has a long noſe with a divided under lip; ſhort broad rounded ears; black eyes, ſlender legs, almoſt naked and black; and a yellow belly. See *Plate* LXI. *Fig.* 4.

3. Cavia Aguti Leporina, the larger agouti; the *Mus Leporinus* of Linnæus; the Java hare of Cateſby, and the Javan cavy of Pennant; has a very ſhort tail; the upper parts of the body reddiſh, and the under white; a ſmall ſlender head; with prominent, naked, rounded ears.—All theſe 3 varieties inhabit S. America and the W. India iſlands. They ſearch for their food through the day, and carry it home to their dwellings, where they hoard what they cannot eat. They feed ſitting on their hind legs, and carry their food with their fore paws to their mouth. Their fleſh is ſavoury like that of a rabbit. They all grunt like pigs, and are very voracious. When angry they beat the ground with their feet. See *Plate* LXI. *Fig.* 5.

III. 1. Cavia Aperea, the Aperea, or Braſilian coney, has no tail; is reddiſh above, and white below; has ſhort ears; 4 toes before and 3 behind, the middle one longeſt; the upper lip divided; the fore feet black and naked. It lives in holes of rocks, from which it is hunted by ſmall dogs. It is about a foot long, and runs like a hare. The fleſh reſembles that of a rabbit, but excels it in flavour.

2. Cavia Aperea nigra, the rock cavy of Mr Pennant, reſembles the firſt variety in every thing but the colour; being black mottled with tawny.

IV. Cavia Capybara, the Sus Hydrochæris of Linnæus, or river hog of Dampier, has 5 webbed toes guarded by hoofs, on the hind feet, but no tail; is above 2½ feet long; the head and noſe are large and thick; the eyes black; the ears ſmall, erect, rounded and naked; the upper jaw long; and the upper lip divided. The neck and legs are ſhort, and the hair is harſh like briſtles. See *Plate* LXI. *Fig.* 6. Theſe animals inhabit the E. of S. America, from the iſthmus to Braſil and Paraguay; live in fenny woods near rivers; ſwim, dive and keep long under water; catch fiſh at night, but bring them on ſhore and eat them ſitting on their hind legs, like apes. They feed alſo on vegetables, are fond of the ſugar cane; and do much miſchief in gardens. They keep together in large herds and make a noiſe like the braying of aſſes. In the breeding ſeaſon they pair: the female produces but one at a birth. They are eaſily rendered tame and become familiar. Their fleſh is tender, but has a fiſhy flavour.

V. Cavia Cobaya, the *Mus Porcellus*, Guinea pig, or *Pig-like mouſe* of Linnæus, and the *Reſtleſs Cavy* of Pennant, has 4 toes on the fore, and 3 on the hind feet, but no tail: the colour is white, variegated with irregular orange and black blotches. The body is thick, and ſeldom exceeds 7 inches in length. It has ſhort broad ears, and large, prominent browniſh eyes. See *Fig.* 7. It inhabits Braſil, and its manners in a wild ſtate are not deſcribed by zoologiſts. In a domeſtic ſtate, the guinea pigs are very reſtleſs, and grunt continually, like young pigs. They feed on bread, grain, fruits, &c. Buffon alledges they never drink, but Gmelin ſays they drink water. When engaged in their amours they chirp like birds: when hurt they emit a ſharp cry. They are very delicate and cannot bear cold or moiſture. The female breeds at 3 months old; goes with young 3 weeks; brings from 4 to 12 at a birth, though ſhe has only two teats; and takes the male 12 or 15 days after littering. They are of tame and gentle, but ſtupid diſpoſitions.

VI. Cavia Magellanica, the Patagonian Hare or Cavy, is ſo large as to weigh ſometimes 26 lb. It has long legs, with 4 toes before, and 3 behind, armed with long black claws; hardly any tail; the noſe has tufts of curly hair, and long numerous whiſkers; the ears are long and dilated; the upper lip divided: the face and back aſh-coloured; breaſt and ſides tawny; the belly a dirty white. See *Fig.* 8. It inhabits the country about Port Deſire in Patagonia. The fleſh is white and well flavoured. It feeds on vegetables, and burrows in the ground.

VII. 1. Cavia Paca, the Mus Paca of Linnæus, or *Spotted Cavy* of Pennant, has 5 toes on all the feet; and the ſides are marked with rows of grey or pale yellow ſpots. The body and head meaſure about two feet in length; the tail is like a ſmall button, and ſo extremely ſhort as to be hardly apparent; the mouth is very ſmall; the upper lip divided; the noſtrils are very large, and the muzzle is garniſhed with long whiſkers; the ears are ſhort and roundiſh; the eyes are large, prominent, and browniſh; the two cutting teeth in each jaw are very long and of great ſtrength; the hind legs are longer than the fore. See *Plate* LXI. *Fig.* 9. This ſpecies inhabits Braſil, Guiana, and probably all the warmer parts of America. It lives in fenny places near rivers, burrowing in the ground, and keeping its hole exceedingly clean, to which it has always 3 diſtinct outlets. It grows very fat, and is eſteemed a great delicacy. The female has two teats ſituated between the hind thighs, and has only a ſingle young one at a litter.—It is difficult to take this animal alive. When ſurpriſed in its hole, which the hunters lay open both before and behind, it defends itſelf, and even bites fiercely. It is, however, eaſily accuſtomed to a domeſtic life. Unleſs irritated, it is gentle and tractable, fond of adulation, and licks the hands of the perſon who careſſes it. It knows thoſe who take care of it, and gently diſtinguiſhes their voices. When gently ſtroaked on the back, it ſtretches itſelf out, lies down on its belly, by a ſmall cry expreſſes its acknowledgement,

knowledgement, and ſeems to aſk a continuance of the favour: but if ſeized in a rough manner, it makes very violent efforts to eſcape. When kept in a wooden cage or box, it remains perfectly tranquil during the day, eſpecially when plentifully ſupplied with food. It ſeems even to have an affection for its retreat as long as the day laſts; for, after feeding, it retires ſpontaneouſly into it. But when night approaches, by perpetual reſtleſneſs and agitation, and by tearing the bars of its priſon with its teeth, it diſcovers a violent deſire of getting out. Nothing of this kind happens during the day, unleſs it has occaſion for ſome natural evacuation; for it cannot endure the ſmalleſt degree of dirtineſs in its little apartment; and when about to void its excrements, always retires to the moſt diſtant corner it can find. When its ſtraw begins to ſmell, it puſhes it out with its muzzle, and goes in queſt of rags or paper to replace it. In a female cavy, the following extraordinary inſtance of cleanlineſs was obſerved. A large male rabbit being ſhut up with her when ſhe was in ſeaſon, ſhe took an averſion to him the moment he voided his excrement in their common apartment. Before this ſhe was very fond of him; licked his noſe, ears, and body; and allowed him to take almoſt the whole food that was given her. But as ſoon as the rabbit had infected the cage with his ordure, ſhe retired to the bottom of an old preſs, where ſhe made a bed with paper and rags, and did not return to her old lodging till ſhe ſaw it clean, and freed from the unclean gueſt which had been preſented to her.

2. CAVIA PACA ALBA, the white Paca, inhabits the environs of the river St Francis in S. America; and reſembles the other kind in every reſpect except that it is entirely white.

CAVIANA, an iſland of South America, at the mouth of the river Amazon, 90 miles in circumference, and of a triangular form, with its baſe to the ocean. It lies under the equinoctial line in Lon. 50. 20. W.

(1.) * **CAVIARE.** *n. ſ.* [the etymology uncertain, unleſs it come from *garum*, Lat. ſauce, or pickle, made of fiſh ſalted.] The eggs of a ſturgeon being ſalted, and made up into a maſs, were firſt brought from Conſtantinople by the Italians, and called *caviare*. *Grew's Muſæum.*

(2.) CAVIARE is but lately introduced into Britain. The hard roes of the ſturgeon, (ſee ACCIPENSER, N° 3.) are formed into ſmall cakes, about an inch thick and 3 or 4 inches broad, by taking out all the nerves or ſtrings; then waſhing the ſpawn in white wine or vinegar, and ſpreading it on a table. It is then ſalted and preſſed in a fine bag; after which it is caſed up in a veſſel with a hole at the bottom, that if any moiſture is left it may run out. Caviare is in great requeſt among the Muſcovites, on account of their 3 lents, which they keep with a ſuperſtitious exactneſs. The Italians ſettled at Moſcow drive a very great trade in it throughout that empire, there being a prodigious quantity of ſturgeon taken at the mouth of the Wolga and other rivers which fall into the Caſpian ſea. A pretty large quantity of Caviare is alſo conſumed in Italy and France. They get it from Archangel, but commonly buy it at ſecond hand of the Engliſh and Dutch.—According to Savary, the beſt caviare brought from Muſcovy is prepared from the belluga, which is much preferable to that made of the ſpawn of ſturgeon. (See BELLUGA, N° 1.) A kind of caviare, or rather ſauſage, is alſo made from the ſpawn of ſome other fiſhes; particularly a ſort of mullet caught in the Mediterranean. See BOTARGO, § 1, 2; and MUGIL.

(3.) CAVIARE INSECT. See AXAYACATL.

CAVIDOS. See CABIDOS.

* **CAVIER.** *n. ſ.* A corruption of *caviare*. See CATSUP.

(1.) * **CAVIL.** *n. ſ.* [from the verb.] Falſe or frivolous objections.—Wiſer men conſider how ſubject the beſt things have been unto *cavil*, when wits, poſſeſſed with diſdain, have ſet them up as their mark to ſhoot at. *Hooker.*

(2.) CAVIL, [*cavillatio*,] is defined by ſome a fallacious kind of reaſon, carrying ſome reſemblance of truth, which a perſon, knowing its falſehood, advances in diſpute for the ſake of victory.

(1.) * *To* CAVIL. *v. a.* [*caviller*, Fr. *cavillari*, Lat.] To receive or treat with objections.—

Thou didſt accept them: wilt thou enjoy the good,
Then *cavil* the conditions? *Paradiſe Loſt.*

(2.) * *To* CAVIL. *v. n.* To raiſe captious and frivolous objections.—

My lord, you do not dwell, in obſtinacy
To *cavil* in the courſe of this contract. *Shak.*

* **CAVILLATION.** *n. ſ.* [from *cavil*.] The diſpoſition to make captious objections; the practice of objecting.—I might add ſo much concerning the large odds between the caſe of the eldeſt churches in regard of heathens, and ours, in reſpect of the church of Rome, that very *cavillation* itſelf ſhould be ſatisfied. *Hooker.*

CAVILLATORIA, a term uſed by Boethius for the art of framing ſophiſms or fallacies.

* **CAVILLER.** *n. ſ.* [*cavillator*, Lat.] A man fond of making objections; an unfair adverſary; a captious diſputant.—The candour which Horace ſhews, is that which diſtinguiſhes a critick from a *caviller*; he declares, that he is not offended at little faults, which may be imputed to inadvertency. *Addiſon's Guardian.*

* **CAVILLINGLY.** *adv.* [from *cavilling*.] In a cavilling manner.

* **CAVILLOUS.** *adj.* [from *cavil*.] Unfair in argument; full of objections.—Thoſe perſons are ſaid to be *cavillous* and unfaithful advocates, by whoſe fraud and iniquity juſtice is deſtroyed. *Ayliffe.*

* **CAVIN.** *n. ſ.* [French. In the military art.] A natural hollow, fit to cover a body of troops, and conſequently facilitate their approach to a place. *Dict.*

CAVINA, a town in the iſland of Manilla, with a ſtrong caſtle, a harbour and dock. It is 10 miles from the city of Manilla.

* **CAVITY.** *n. ſ.* [*cavitas*, Latin.] Hollowneſs; hollow; hollow place.—The vowels are made by a free paſſage of breath, vocalized through the *cavity* of the mouth; the ſaid *cavity* being differently ſhaped by the poſtures of the throat, tongue, and lips. *Holder's Elements of Speech.*—There is

nothing to be left void in a firm building; even the *cavities* ought not to be filled with rubbiſh, which is of a periſhing kind.

(1.) * CAUK. *n. ſ.* A coarſe talky ſpar. *Woodw.*

(2.) Cauk, or Cawk. See Chemistry, *Index*, and Terra Ponderosa.

CAUKING. See Caulking.

* CAUKY. *adj.* [from *cauk*.] A white, opaque *cauky* ſpar, ſhot or pointed. *Woodward on Foſſils.*

(1.) * CAUL. *n. ſ.* [of uncertain etymology.] 1. The net in which women incloſe their hair; the hinder part of a woman's cap—

> Her head with ringlets of her hair is crown'd,
> And in a golden *caul* the curls are bound.
>
> *Dryden's Æneid.*

2. Any kind of ſmall net.—An Indian mantle of feathers, and the feathers wrought into a *caul* of packthread. *Grew's Muſeum.* 3. The omentum; the integument in which the guts are incloſed.—The *caul* ſerves for the warming the lower belly, like an apron or piece of woollen cloth. Hence a certain gladiator, whoſe *caul* Galen cut out, was ſo liable to ſuffer cold, that he kept his belly conſtantly covered with wool. *Ray.*

(2.) Caul, § 1. *def.* 3. See Anatomy, *Index*.

(3.) Caul, in mid-wifery, a little membrane, found on ſome children, encompaſſing the head when born. It is only a fragment of the membranes of the fœtus, which ordinarily break at the birth of the child. Lampridius tells us, that the midwives ſold theſe membranes at a good price to the advocates of his time; it being an opinion, that while they had a caul about them, they ſhould carry a force of perſuaſion which no judge could withſtand. The canons forbid the uſe of it; becauſe ſome witches and ſorcerers had abuſed it. Superſtitious ſailors ſtill entertain the notion, that a caul on board a ſhip will preſerve it from ſhipwreck.

CAULCOT, a village in Northamptonſhire, E. of Higham-Ferrers.

CAULDON, in Staffordſhire, W. of Blore.

CAULESCENS. See Botany, *Gloſſary*.

* CAULIFEROUS. *adj.* [from *caulis*, a ſtalk, and *fero*, to bear, Lat.] A term in botany for ſuch plants as have a true ſtalk, which a great many have not.

(1.) * CAULIFLOWER. *n. ſ.* [from *caulis*, Lat. the ſtalk of a plant.] A ſpecies of *cabbage*.—Towards the end of the month, earth up your winter plants and ſalad herbs; and plant forth your *cauliflowers* and cabbage, which were ſown in Auguſt. *Evelyn's Kalendar.*

(2.) Cauliflowers. See Brassica, § II.

CAULINA. See Botany, *Gloſſary*.

CAULIS. See Botany, *Index* and *Gloſſ.*

* *To* Caulk. See *To* Calk.

(1.) CAULKING, or Cauking, of a ship, is driving very cloſe a quantity of oakum, or old ropes untwiſted and drawn aſunder, into the ſeams of the planks, or into the intervals where the planks are joined together, in the ſhip's decks or ſides, in order to prevent the entrance of water. After the oakum is driven very hard into theſe ſeams, it is covered with hot melted pitch or roſin, to keep the water from rotting it. Among the ancients, the firſt who made uſe of caulking, were the inhabitants of Phœacia, or Corſica. Wax and roſin appear to have been commonly uſed previous to that period. The Poles uſe a ſort of unctuous clay for the ſame purpoſe, on their navigable rivers.

(2.) Caulking irons, iron chiſſels formed for caulking. Some of theſe are broad, ſome round, and others grooved. After the ſeams are ſtopped with oakum, it is done over with a mixture of tallow, pitch, and tar, as low as the ſhip draws water.

CAUNARD, a town of France, in the department of Gers, and ci-devant province of Gaſcony.

CAUNE, a town of France, in the department of Tarn, and ci-devant province of Upper Languedoc; ſeated near the mountains where the Agout riſes; 21 miles NE. of Caſtres. Lon. 2. 43. E. Lat. 43. 40. N.

CAUNTON, in Nottinghamſhire, near Norwell.

CAUNUS, in the mythology. See Byblis.

* *To* CAUPONATE. *v. n.* [*caupono*, Lat.] To keep a victualling-houſe; to ſell wine or victuals. *Dict.*

CAURIS, in natural hiſtory, a name given by ſome to the genus of ſhells called, by the generality of writers, *porcellana*, and *concha venerea*. From a falſe pronunciation of this word, we call theſe ſhells *cowries*. See Porcelain shell.

CAURSINES, } Italians who came into England about 1235, terming
CAURSINI, } themſelves *the Pope's merchants*, but driving no other trade but letting out money; and having great banks in England, they differed little from Jews, except that they were more merciless to their debtors. Some will have them called Coursini, *i. e. cauſa urſini*, beariſh and cruel in their cauſes: others Coarsini, or *Corſini*, as coming from Corſica; but Cowel ſays, they have their name from *Caorſium*, a town in Lombardy, where they firſt practiſed their extortions; from whence they carried their infamous trade through moſt parts of Europe, and were a common plague to every nation where they came. The then biſhop of London excommunicated them; and king Henry III. baniſhed them in 1240. But, being the pope's ſolicitors, they were permitted to return in 1250; though they were ſoon again expelled on account of their intolerable uſuries. See Bankers, § 4.

* CAUSABLE. *adj.* [from *cauſo*, low Lat.] That which may be cauſed, or effected by a cauſe.—That may be miraculouſly effected in one, which is naturally *cauſeable* in another. *Brown.*

* CAUSAL. *adj.* [*cauſalis*, low Lat.] Relating to cauſes; implying or containing cauſes.—Every motion owning a dependence on prerequired motion, we can have no true knowledge of any, except we would diſtinctly pry into the whole method of *cauſal* concatenation. *Glanville.*—*Cauſal* propoſitions are, where two propoſitions are joined by *cauſal* particles; as, houſes were not built *that* they might be deſtroyed; Rehoboam was unhappy, *becauſe* he followed evil counſel. *Watts.*

* CAUSALITY. *n. ſ.* [*cauſalitus*, low Latin.] The agency of a cauſe; the quality of cauſing.—As he created all things, ſo he is beyond and in

them all, in his very eſſence, as being the ſoul of their *cauſalities*, and the eſſential cauſe of their exiſtences. *Brown's Vulgar Errours.*

* CAUSALLY. *adv.* [from *cauſal.*] According to the order or ſeries of cauſes.—Thus may it more be *cauſally* made out, what Hippocrates affirmeth. *Brown's Vulgar Errours.*

CAUSALTY, among miners, denotes the lighter, ſulphureous, earthy part of ores, carried off in the operation of waſhing. This, in the mines, they throw in heaps upon banks, which in 6 or 7 years they find it worth their while to work over again.

CAUSA MATRIMONII PRÆLOCUTI, in common law, a writ that lies where a woman gives land to a man in fee to the intent he ſhall marry her, and he refuſes to do it in a reaſonable time, being required by the woman; and in ſuch caſe, for not performing the condition, the entry of the woman into the lands again has been adjudged lawful. The huſband and wife may ſue this writ againſt the perſon who ought to have married her.

* CAUSATION. *n. ſ.* [from *cauſe*, low Lat.] The act or power of cauſing.—Thus doth he ſometimes delude us in the conceits of ſtars and meteors, beſides their allowable actions, aſcribing effects thereunto of independent *cauſation*. *Brown.*

* CAUSATIVE. *adj.* [a term in grammar.] That expreſſes a cauſe or reaſon.

* CAUSATOR. *n. ſ.* [from *cauſo*, low Lat.] A cauſer; an author of any effect.—Demonſtratively underſtanding the ſimplicity of perfection, and the inviſible condition of the firſt *cauſator*, it was out of the power of earth, or the areopagy of hell, to work them from it. *Brown.*

CAUSBY, a town W. of Alford, Lincolnſhire.

CAUS-CASTLE, 4 miles E. of Powis-Caſtle, Salop.

(I.) * CAUSE. *n. ſ.* [*cauſa*, Lat.] 1. That which produces or effects any thing; the efficient.—The wiſe and learned among the very heathens themſelves, have all acknowledged ſome firſt *cauſe*, whereupon originally the being of all things dependeth; neither have they otherwiſe ſpoken of that *cauſe*, than as an agent, which, knowing what and why it worketh, obſerveth, in working, a moſt exact order or law. *Hooker.*—Butterflies, and other flies, revive eaſily when they ſeem dead, being brought to the ſun or fire; the *cauſe* whereof is the diffuſion of the vital ſpirit, and the dilating of it by a little heat. *Bacon's Natural Hiſtory.* —*Cauſe* is a ſubſtance exerting its power into act, to make one thing begin to be. *Locke.* 2. The reaſon; motive to any thing.—So great, ſo conſtant, and ſo general a practice, muſt needs have not only a *cauſe*, but alſo a great, a conſtant, and a general *cauſe*, every way commenſurate to ſuch an effect. *South.* 3. Reaſon of debate; ſubject of litigation.—Hear the *cauſes* between your brethren, and judge righteouſly between every man and his brother, and the ſtranger that is with him. *Deut.* 4. Side; party; ground or principle of action or oppoſition.—

Ere to thy *cauſe*, and thee, my heart inclin'd,
Or love to party had ſeduc'd my mind. *Tickell.*

(II.) Cause, (§ I. *def.* 1.) ſtands oppoſed to effect. We get the idea of cauſe and effect from obſerving the viciſſitudes of things, while we perceive ſome qualities or ſubſtances begin to exiſt, and that they receive their exiſtence from the due application and operation of other beings. Thus, fluidity in wax or metals, is the effect of a certain degree of heat, which we obſerve to be conſtantly produced by the application of ſuch heat; which we therefore ſtile the cauſe.

(III.) Cause, in philoſophy. Ariſtotle, and the ſchoolmen after him, diſtinguiſhed 4 kinds of cauſes; the efficient, the material, the formal, and the final. This, like many of Ariſtotle's diſtinctions, is only a diſtinction of the various meanings of an ambiguous word; for the efficient, the matter, the form, and the end, have nothing common in their nature, by which they may be accounted a ſpecies of the ſame *genus*; but the Greek word, which we tranſlate *cauſe*, had theſe 4 different meanings in Ariſtotle's days, and we have added other meanings. We do not indeed call the matter or the form of a thing its cauſe; but we have final cauſes, inſtrumental cauſes, occaſional cauſes, and many others. Thus the word *cauſe* has been ſo hackneyed, and made to have ſo many different meanings in the writings of philoſophers, and in the diſcourſe of the vulgar, that its original and proper meaning is loſt. With regard to the phenomena of nature, the important end of knowing their cauſes, is, that we may know when to expect them, or how to bring them about. This is very often of real importance in life; and this purpoſe is ſerved, by knowing what, by the courſe of nature, goes before them and is connected with them; and this, therefore, we call the *cauſe* of ſuch a phenomenon.—If a magnet be brought near to a mariner's compaſs, the needle, which was before at reſt, immediately begins to move, and bends its courſe towards the magnet, or perhaps the contrary way. If an unlearned ſailor is aſked the cauſe of this motion of the needle, he is at no loſs for an anſwer. He tells you it is the magnet; and the proof is clear; for, remove the magnet, and the effect ceaſes; bring it near, and the effect is again produced. It is, therefore, evident to ſenſe, that the magnet is the cauſe of this effect. A Carteſian philoſopher enters deeper into the cauſe of this phenomenon. He obſerves, that the magnet does not touch the needle, and therefore can give it no impulſe. He pities the ignorance of the ſailor. The effect is produced, ſays he, by magnetic effluvia, or ſubtile matter, which paſſes from the magnet to the needle, and forces it from its place. He can even ſhew you, in a figure, where theſe magnetic effluvia iſſue from the magnet, what round they take, and what way they return home again. And thus he thinks he comprehends perfectly how, and by what cauſe the motion of the needle is produced. A Newtonian philoſopher enquires what proof can be offered for the exiſtence of magnetic effluvia, and can find none. He therefore holds it as a fiction, a hypotheſis; and he has learned that hypotheſes ought to have no place in the philoſophy of nature. He confeſſes his ignorance of the real cauſe of this motion, and thinks that his buſineſs as a philoſopher is only to find from experiment the laws by which it is regulated in all caſes. Theſe three perſons differ much in their ſentiments with regard to the real cauſe of this phenomenon; and the man who knows moſt is he who is ſenſible that he knows nothing of the matter. Yet all the three ſpeak the ſame language, and acknowledge that the cauſe of this motion is the attractive or repulſive power of the magnet. What has been ſaid of this, may be applied to every phenomenon that falls within the compaſs of natural philoſophy. We deceive ourſelves, if we conceive that we can point out the real efficient cauſe of any one of them. The grandeſt diſcovery ever made in natural philoſophy, was that of the law of gravitation, which opens ſuch a view of our planetary ſyſtem, that it looks like ſomething divine. But the author of this diſcovery was aware that he diſcovered no real cauſe, but only the law or rule according to which the unknown cauſe operates. Natural philoſophers who think accurately, have a preciſe meaning to the terms they uſe in the ſcience; and when they pretend to ſhow the cauſe of any phenomenon of nature, they mean by the cauſe a law of nature of which that phenomenon is a neceſſary conſequence. The whole object of natural philoſophy, as Newton teaches, is reducible to theſe two heads: firſt, by juſt induction from experiment and obſervation, to diſcover the laws of nature; and then to apply thoſe laws to the ſolution of the phenomena of nature. This was all that this great philoſopher attempted, and all that he thought attainable. And this indeed he attained in a great meaſure, with regard to the motions of our planetary ſyſtem, and with regard to the rays of light. But ſuppoſing that all the phenomena, which fall within the reach of our ſenſes, were accounted for from general laws of nature, juſtly deduced from experience; that is, ſuppoſing natural philoſophy brought to its utmoſt perfection, it does not diſcover the efficient cauſe of any one phenomenon in nature. The laws of nature are the rules according to which the effects are produced; but there muſt be a cauſe which operates according to theſe rules. The rules of navigation never navigated a ſhip. The rules of architecture never built a houſe. Natural philoſophers, by great attention to the courſe of nature, have diſcovered many of her laws, and have very happily applied them to account for many phenomena: but they have never diſcovered the efficient cauſe of any one phenomena; nor do thoſe who have diſtinct notions of the principles of the ſcience make any ſuch pretence. Upon the theatre of nature we ſee innumerable effects, which require an agent endowed with active power; but the agent is behind the ſcene. Whether it be the Supreme Cauſe alone, or a ſubordinate cauſe or cauſes; and if ſubordinate cauſes be employed by the Almighty, what their nature, their number, and their different offices may be; are things hid, doubtleſs for wiſe reaſons, from the human eye.

(IV.) Cause, in medical language. The cauſe of a diſeaſe is defined by Galen to be that during the preſence of which we are ill, and which being removed the diſorders immediately ceaſes. The doctrine of the cauſes of diſeaſes is called Etiology. Phyſicians divide cauſes into procatarctic, proximate, and remote.

1. Cause, procatarctic, [αιτια προκαταρκτικη,] or primitive incipient, is either an occaſion which of its own nature does not beget a diſeaſe, but happening on a body inclined to diſeaſes occaſions a fever gout, &c. (ſuch as watching, faſting, and the like;) or an evident and manifeſt cauſe which immediately produces the diſeaſe, as being ſufficient thereto; ſuch as a ſword in reſpect of a wound.

2. Cause, proximate, that principle in the body, which being preſent, the diſeaſe is alſo preſent; or, which being removed, the diſeaſe is taken away; ſuch as the ſtone in a nephritic patient.

3. Cause, remote, predisponent, or antecedent, [αιτια προηγουμενη.] a latent diſpoſition of the body, from whence ſome diſeaſe may ariſe; ſuch as a plethora in reſpect of a fever, or cacochymia in reſpect of a ſcurvy.

(V.) Cause, in the civil law. See Action.

* *To* Cause. *v. a.* [from the noun.] To effect as an agent; to produce.—Never was a man whoſe apprehenſions are ſober, and by a penſive inſpection adviſed, but hath found by an irreſiſtible neceſſity one everlaſting being, all for ever *cauſing* and all for ever ſuſtaining. *Raleigh.*—It is neceſſary in ſuch a chain of cauſes to aſcend to and terminate in ſome firſt, which ſhould be the original of motion, and the cauſe of all other things; but itſelf be *cauſed* by none. *South.*

* CAUSELESLY. *adv.* [from *cauſeleſs.*] Without cauſe: without reaſon.—Human laws are not to be broken with ſcandal, nor at all without reaſon; for he that does it *cauſeleſly*, is a deſpiſer of the law, and undervalues its authority. *Taylor's Holy Living.*

* CAUSELESS. *adj.* [from *cauſe.*] 1. Having no cauſe: original in itſelf.—

Reach th' Almighty's ſacred throne,
And make his *cauſeleſs* pow'r, the cauſe of all
things, known. *Blackmore's Creation.*

2. Wanting juſt ground or motive.—The *cauſeleſs* diſlike, which others have conceived, is no ſufficient reaſon for us to forbear in any place. *Hooker.*

* CAUSER. *n. ſ.* [from *cauſe.*] He that cauſes the agent by which an effect is produced.—His whole oration ſtood upon a ſhort narration, what was the *cauſer* of this metamorphoſis. *Sidney.*

(1.) * CAUSEWAY. Causey. *n. ſ.* [*chauſſee*, Fr. This word, by a falſe notion of its etymology, has been lately written *cauſeway.*] A way raiſed and paved; a way raiſed above the reſt of the ground.—To Shuppim the lot came forth weſtward by the *cauſey*. 1 *Chron.* xxvi. 16.—

But that broad *cauſeway* will direct your way,
And you may reach the town by noon of day.
Dryden.

(3.) Causeway, or Causey, a maſſive conſtruction of ſtone, ſtakes, and faſcines; or an elevation of fat, viſcous earth, well beaten; ſerving either as a road in wet marſhy places, or as a mole to retain the waters of a pond, or prevent a river from overflowing the lower grounds. See Road.

(3.) Causeway, Devil's, a famous road, of ſtones and rubbiſh, which ranges through the county of Northumberland, commonly ſuppoſed to be Roman, though Mr Horſley ſuſpects it to be of later times.

(4.) Causeway, Giant's, a huge pile of Baſaltic columns in Coleraine, Ireland. See Basaltes, § 5, and Giant's Causey.

CAUSEY. See Causeway, § 1 and 2.

Causey-Park, near Morpeth, Northumberl.

CAUSODES, or Causon. See Causus.

CAUSSIN, Nicholas, ſurnamed the Juſt, a French Jeſuit, born at Troyes in Champagne, in 1580. He entered into the Jeſuits order when he was 16 years of age; taught rhetoric in ſeveral of their colleges, and preached with great applauſe. He increaſed this reputation by publiſhing books, and in time was preferred to be confeſſor to the king. But though he diſcharged his office to the ſatisfaction of every honeſt man, he did not pleaſe Richelieu, and was therefore removed. He died at Paris in 1651. His work entitled *La Cour Sainte*, has been often printed; and tranſlated into Latin, Italian, Spaniſh, Portugueſe, German, and Engliſh. He publiſhed ſeveral other books both in Latin and French.

CAUSTIA, in antiquity, a kind of woollen cap uſed by the Macedonians; which was ſo ſtrong as ſometimes to ſerve inſtead of a helmet.

CAUSTIC Curve, in the higher geometry, a curve formed by the concourſe or coincidence of the rays of light reflected from ſome other curve.

CAUSTICITY, a quality belonging to ſeveral ſubſtances, by the acrimony of which the parts of living animals may be corroded and deſtroyed. Bodies which have this quality, when taken internally, are true poiſons. The cauſticity of ſome of theſe, as of arſenic, is ſo deadly, that even their external uſe is proſcribed by moſt phyſicians. Several others, as nitrous acid, lapis infernalis or lunar cauſtic, common cauſtic, and butter of antimony, are daily and ſucceſsfully uſed to conſume fungous fleſh, to open iſſues, &c. They ſucceed very well when properly employed and ſkilfully managed. The cauſticity of bodies depends entirely on the ſtate of the ſaline, and chiefly of the acid, matters they contain. When theſe acids happen to be at the ſame time much concentrated, and ſlightly attached to the matters with which they are combined, they are then capable of acting, and are corroſive and cauſtic. Thus fixed and volatile alkalies, although they are themſelves cauſtic, become much more ſo by being treated with quicklime: becauſe this ſubſtance deprives them of much fat and inflammable matter, and all their fixed air, which binds and reſtrains the action of their ſaline principle. By this treatment, then, the ſaline principle is more diſengaged, and rendered more capable of action. Alſo all combinations of metallic matters with acids form ſalts more or leſs corroſive, becauſe theſe acids are deprived of all their ſuperabundant water, and are beſides but imperfectly ſaturated with the metallic matters. Nevertheleſs, ſome other circumſtance is neceſſary to conſtitute the cauſticity of theſe ſaline metalline matters. For the ſame quantity of marine acid, which, when pure and diluted with a certain quantity of water, would be productive of no harm, produces all the effects of a corroſive poiſon, when united with mercury in *corroſive ſublimate*, although the ſublimate be diſſolved in ſo much water, that its cauſticity cannot be attributed to the concentration of its acid. This effect is, by ſome chemiſts attributed to the great weight of the metallic matters with which the acid is united: and this opinion is very probable, ſeeing its cauſticity is nothing but its diſſolving power, or its diſpoſition to combine with other bodies; and this diſpoſition is nothing elſe than attraction. On this ſubject Dr Black obſerves, that the compounds produced by the union of the metals with acids are in general corroſive. Many of them applied to the ſkin deſtroy it almoſt as faſt as the mineral acids; and ſome of the moſt powerful potential cauteries are made in this way. Some are reckoned more acrid than the pure acids themſelves; and they have more powerful effects when taken internally, or at leaſt ſeem to have. Thus we can take 10 or 12 drops of a foſſile acid, diluted with water, without being diſturbed by it; but the ſame quantity of acid previouſly combined with ſilver, quickſilver, copper, or regulus of antimony, will throw the body into violent diſorders, or even prove a poiſon, if taken all at once. This increaſed activity was, by the mechanical philoſophers, ſuppoſed to ariſe from the weight of the metallic particles. They imagined that the acid was compoſed of minute particles of the ſhape of needles or wedges; by which means they were capable of entering the pores of other bodies, ſeparating their atoms from each other, and thus diſſolving them. To theſe acid ſpiculæ the metallic particles gave more force; and the momentum of each particular needle or wedge was increaſed in proportion to its increaſe of gravity by the additional weight of the metallic particle. But this theory is entirely fanciful, and does not correſpond with facts. The activity of the compound is not in proportion to the weight of the metal; nor are the compounds always poſſeſſed of any great degree of acrimony: neither is it true that any of them have a greater power of deſtroying animal ſubſtances than the pure acids have. There is a material difference between the powers called *ſtimuli* and *corroſives*. Let a perſon apply to any part of the ſkin a ſmall quantity of lunar cauſtic, and likewiſe a drop of ſtrong nitrous acid, and he will find that the acid acts with more violence than the cauſtic. The diſorders occaſioned by the compounds of metals and acids do not proceed from a *cauſticity* in them, but from the metal affecting and proving a ſtimulus to the nerves: and that this is the caſe, appears from their affecting ſome particular nerves of the body. Thus the compounds of regulus of antimony and mercury with the vegetable acids, do not ſhow the ſmalleſt degree of acrimony; but, taken internally, they produce violent convulſive motions over the whole body, which are occaſioned by the metallic matter having a power of producing this effect; and the acid is only the means of bringing it into a diſſolved ſtate, and making it capable of acting on the nervous ſyſtem. In general, however, the compounds of metallic ſubſtances with acids may be conſidered as milder than the acids in a ſeparate ſtate; but the acid is not ſo much neutralized as in other compounds, for it is leſs powerfully attracted by the metal; ſo that alkaline ſalts, abſorbent earths, or even heat alone, will decompound them; and ſome of the inflammable ſubſtances, as ſpirit of wine, aromatic oils, &c. will attract the acid, and precipitate the metal in its metallic form; and the metals can be employed to precipitate one another in their metallic form; ſo that the coheſion of theſe compounds is much weaker than thoſe formed of the ſame acids with alkaline ſalts or earths.

(1.) * CAUSTICK. Caustical. *adj.* [καυςικος.] Epithets of medicaments which deſtroy the texture of the part to which they are applied, and eat it away, or burn it into an eſchar, which they do by extreme minuteneſs, aſperity, and quantity of motion, that, like thoſe of fire itſelf, deſtroy the texture of the ſolids, and change what they are applied to into a ſubſtance like burnt fleſh; which, in a little time, with detergent dreſſing, falls quite off, and leaves a vacuity in the part. *Quincy.*—If extirpation be ſafe, the beſt way will be by *cauſtical* medicines, or eſcaroticks. *Wiſem.*

(2.) * Caustick. *n. ſ.* A burning application. —It was a tenderneſs to mankind, that introduced corroſives and *cauſticks*, which are indeed but artificial fires. *Temples.*

(3.) Caustics are generally divided into four ſorts; the common ſtronger cauſtic, the common milder cauſtic, the antimonial cauſtic, and the lunar cauſtic. See Causticity, Chemistry, and Pharmacy.

CAUSTON Hall, near Dunchurch, Warwick.

CAUSUS, or the Burning Fever, a ſpecies of continual fever, accompanied with a remarkable inflammation of the blood.

CAUSWAY, near Arundel, Suſſex.

* CAUTEL. *n. ſ.* [*cautela*, Lat.] Caution; ſcruple: a word diſuſed.—

Perhaps he loves you now;
And now no ſoil nor *cautel* doth beſmirch
The virtue of his will. *Shakeſpeare.*

* CAUTELOUS. *adj.* [*cautelaux*, Fr.] 1. Cautious: wary; provident. Not in uſe.—Palladio doth wiſh, like a *cautelous* artiſan, that the inward walls might bear ſome good ſhare in the burden. *Wotton.* 2. Wily; cunning; treacherous.—Of themſelves, for the moſt part, they are ſo *cautelous* and wily headed, eſpecially being men of ſo ſmall experience and practice in law matters, that you would wonder whence they borrow ſuch ſubtilities and ſly ſhifts. *Spenſer on Ireland.*

* CAUTELOUSLY. *adv.* [from *cautelous.*] 1. Cunningly; ſlily; treacherouſly. Not in uſe. —All pretorian courts, if any of the parties be laid aſleep, under pretence of a retirement, and the other party doth *cauteloully* get the ſtart and advantage, yet they will ſet back all things *in ſtatu quo prius*. *Bacon.* 2. Cautiouſly; warily.—The Jews, not reſolved of the ſciatica ſide of Jacob, do *cauteloully*, in their diet, abſtain from both. *Brown.*

CAUTERETS, a village of France, in the department of the Upper Pyrenees, and ci-devant province of Bigorre, noted for its mineral water. It is 18 miles SW. of Bagneres.

(1.) * CAUTERIZATON. *n. ſ.* [from *cauterize*]. The act of burning fleſh with hot irons, or cauſtic medicaments.—They require, after *cauterization*, no ſuch bandage, as that thereby you need to fear interception of the ſpirits. *Wiſeman.*

(2.) Cauterization. In ſome places they cauterize with burning tow, in others with cotton or moxa, in others with live coals; ſome uſe Spaniſh wax, others pyramidal pieces of linen, others gold or ſilver; Severinus recommends flame blown through a pipe; but what is uſually preferred among us is a hot iron. See Cuterizing Irons.

* *To* CAUTERIZE. *v. a.* [*cautoriſer*, Fr.] To burn with the cautery.—No marvel though cantharides have ſuch a corroſive and *cauterizing* quality; for there is not one or other of the inſecta, but is bred of a duller matter. *Bacon.*—The deſign of the cautery is to prevent the canal from cloſing; but the operators confeſs, that, in perſons *cauterized*, the tears trickle down ever after. *Sharp.*

CAUTERIZING Irons are of various figures; ſome flat, others round, ſome curved, &c. of all which we find draughts in Albucaſis, Scultetus, Ferrara, and others. Sometimes a cautery is applied through a capſula, to prevent any terror from the ſight of it. This method was invented by Placentinus, and is deſcribed by Scultetus. In the uſe of all cauteries, care is to be taken to defend the neighbouring parts, either by a lamina, defenſive plaſter, or lint moiſtened in oxyerate. Sometimes the hot iron is tranſmitted through a copper cannula, for the greater ſafety of the adjoining parts. The degrees and manners of cauterizing are varied according to the nature of the diſeaſe and the part affected. See Burning, § 6.

(1.) CAUTERY, in ſurgery, a medicine for burning, eating, or corroding any ſolid part of the body. See Pharmacy.

(2.) * Cautery. *n. ſ.* [καιω, *uro.*] *Cautery* is either actual or potential; the firſt is burning by a hot iron, and the latter with cauſtick medicines. The actual *cautery* is generally uſed to ſtop mortification, by burning the dead parts to the quick; or to ſtop the effuſion of blood, by ſearing up the veſſels. *Quincy.*—In heat of fight it will be neceſſary to have your actual *cautery* always ready; for that will ſecure the bleeding arteries in a moment. *Wiſeman's Surgery.*

CAUTHORP, three villages in Yorkſhire, viz. 1. NW. of Barneſley: 2. NE. of Maſham: and, 3. NW. of Pickering.

CAUTHWATE, a town in Cumberland, E. of Inglewood Foreſt

(1.) * CAUTION. *n. ſ.* [*caution*, Fr. *cautio*, Lat] 1. Prudence, as it reſpects danger; foreſight: provident care; warineſs againſt evil. 2. Security for.—Such conditions, and *cautions* of the condition, as might aſſure with as much aſſurance as worldly matters bear. *Sidney.* 3. Proviſion or ſecurity againſt.—In deſpite of all the rules and *cautions* of government the moſt dangerous and mortal of vices will come off. *L'Eſtrange.* 4. Proviſionary precept.—Attention to the forementioned ſymptoms affords the beſt *cautions* and rules of diet, by way of prevention. *Arbuthnot.* 5. Warning.

(2.) Caution, in the civil and Scots law, is the ſame with Bail in the law of England. See Bail, § 1-3.

* *To* CAUTION. *v. a.* [from the noun.] To warn; to give notice of a danger.—

You *caution'd* me againſt their charms,
But never gave me equal arms. *Swift.*

* CAUTIONARY. *adj.* [from *caution.*] Given as a pledge, or in ſecurity.—Is there no ſecurity

for the iſland of Britain? Has the enemy no *cautionary* towns and ſea-ports, to give us for ſecuring trade? *Swift.*

CAUTIONER, in Scots law, that perſon who becomes bound for another to the performance of any deed or obligation. See Law.

CAUTIONRY, *n. ſ.* The act of becoming a cautioner. See Law, *Index.*

* CAUTIOUS. *adj.* [from *cautus*, Lat.] Wary; watchful.—Be *cautious* of him; for he is ſometimes an inconſtant lover, becauſe he hath a great advantage. *Swift.*

* CAUTIOUSLY. *adv.* [from *cautious.*] In an attentive, wary manner; warily.—

They know how fickle common lovers are:
Their oaths and vows are *cautiouſly* believ'd;
For few there are but have been once deceiv'd.
Dryden.

* CAUTIOUSNESS. *n. ſ.* [from *cautious.*] Watchfulneſs; vigilance; circumſpection; provident care; prudence with reſpect to danger.—We ſhould always act with great *cautiouſneſs* and circumſpection, in points where it is not impoſſible that we may be deceived. *Addiſon.*

CAUTION, a town near Hovingham, Yorkſh.

CAUX, a territory of France, in the ci-devant province of Normandy. See Cassetes.

CAVY, in zoology. See Cavia.

* *To* CAW. *v. n.* [taken from the ſound.] To cry as the rook, raven, or crow.—A walk of aged elms, ſo very high, that the rooks and crows upon the tops ſeem to be *cawing* in another region. *Addiſon.*

CAWCOT, Lower, } Two villages, near Big-
Cawcot, Upper, } gleſwade, Bedfordſh.

CAWDERSHAW, S. of Petworth, Suſſex.

CAWDWELL, near Waltham, Leiceſterſhire.

CAWHONIBORN, near Honniborn, Worceſt.

CAWKWELL, a village E. of Stanton.

CAWLEY wood is ſeated on a hill in Buckinghamſhire, that affords a view of 11 counties.

CAWNER, a village in the peak of Derby.

(1.) CAWOOD, a town in the E. Riding of Yorkſhire, ſeated on the Ouſe, near Selby, 12 miles S. of York, and 186 NW. of London. It has a market on Wed. and a fair May 12. Lon. 1. 0. W. Lat. 53. 47. N.

(2.) Cawood, a village in Lancaſhire.

CAWSTON. See Casson, N° 1.

CAWTHORP, two villages in Lincolnſhire, viz. 1. near Bourn: 2. W. of Saltfleet.

CAWTON, 3 villages; viz. 1. in the peak of Derby: 2. in Staffordſhire, E. of Cheadle: 3. in Ditto E. of Handbury.

CAXA, a little coin made of lead mixed with ſome ſcoria of copper, ſtruck in China, but current chiefly at Batam in the iſland of Java, and ſome of the neighbouring iſlands. See Money.

(1.) CAXAMALCA, a diſtrict of Peru in South America.

(2.) Caxamalca, a town in the diſtrict (N° 1.) where there was a moſt ſumptuous palace belonging to the Incas, and a magnificent temple dedicated to the ſun. In this town, Pizarro, the Spaniſh general took Atabalipa the laſt Inca of Peru, and barbarouſly murdered him, in 1553. It is 90 miles from the South ſea, and 300 NNE. of Lima. Lon. 74. 53. W. Lat. 53. 47. N.

CAXON, in metallurgy, a cheſt of ores of ſilver, or any other metal that has been burnt, ground, and waſhed, and is ready to be refined.

(1.) CAXTON, a town in Cambridge-ſhire, 10 miles W. by S. of Cambridge and 46 N. of London. It has a market on Tueſday and fairs, May 5 and Oct. 18. Lon. 0. 10. W. Lat. 52. 10. N.

(2.) Caxton, a village in Kent, 2 miles from Rocheſter.

(3.) Caxton, William, a mercer of London, eminent by the works he publiſhed. He is reputed the firſt who introduced and practiſed the art of printing in England. See Printing, history of.

CAYA, a river of Portugal, which running SE. divides Spain from Portugal and afterwards falls into the Guadiana.

CAYAHEGA, a ſhort navigable river of the United States in the North-Weſtern Territory, which riſes from a ſmall pond near the head of the Muſkingum. After running a few miles it unites with a branch from the NE. and then running NNW. falls into lake Erie. It communicates with the Muſkingum, by a portage of a mile, and conſtitutes part of the Eaſtern boundary of the Indian territory.

CAYANG, in botany, a leguminous plant, cultivated in the Mogul dominions for food. It is a kind of coarſe pulſe; of which the Europeans uſe great quantities on ſhip-board in the Eaſt Indies. It is a ſpecies of the Cytisus. *Poſtl. Dict. Com.*

CAYLLAC, a ſweet ſcented wood which grows in Siam; the Siameſe and Chineſe burn it in their temples.

(1.) CAYENNE, a river of South America, which riſes in the mountains near the lake of Parima, runs through the country of the Galibes; and after a courſe of 300 miles, falls into the ſouth Pacific Ocean, after forming the iſland of

(2.) Cayenne, which is 18 leagues in circumference, and is fertile; but unhealthy, on account of the vapours ariſing from its foreſts and marſhes. A ſettlement was begun on this iſland by the French about 1635. Some time before this period, a report had prevailed, that, in the interior parts of Guiana, there was a country known by the name of *El Dorado* which contained immenſe riches in gold and precious ſtones: more than ever Cortez and Pizarro had found in Mexico and Peru; and this fable had fired the imaginations of every nation in Europe. It is ſuppoſed that this was the country in queſt of which Sir Walter Raleigh went on his laſt voyage. The French were not behind their neighbours in their endeavours to find out ſo deſireable a country. Their attempts however at laſt came to nothing, and the adventurers took up their reſidence on this iſland. In 1643, ſome merchants of Rouen united their ſtock, with a deſign to ſupport the new colony; but, committing their affairs to one Poncet de Bretigny, a man of a ferocious diſpoſition, he declared war both againſt the coloniſts and ſavages, in conſequence of which he was ſoon maſſacred. This cataſtrophe extinguiſhed the ardour of theſe aſſociates. In 1641 a new company was eſtabliſhed, who ſet out with ſuch a capital as enabled them to collect 700 or 800 coloniſts in Paris itſelf. Theſe embarked on the Seine, to ſail down to Havre de Grace; but unfortunately the Abbè de Marivault, a man of great virtue, and the principal promoter of the undertaking, was drowned as he was ſtepping into his boat Another gentleman who was to have acted as general, was aſſaſſinated on his paſſage; and 12 of the principal adventurers, who had promiſed to put the colony into a flouriſhing ſituation, not only were the principal perpetrators of this murder, but uniformly behaved in the ſame atrocious manner. At laſt they hanged one of their own number; two died; three were baniſhed to a deſart iſland; and the reſt abandoned themſelves to every kind of exceſs. The commandant of the citadel deſerted to the Dutch with part of his garriſon. The ſavages, rouſed by numberleſs provocations, fell upon the remainder; ſo that the few who were left thought themſelves happy in eſcaping to the Leeward Iſlands in a boat and two canoes, abandoning the fort, ammunition, arms, and merchandiſe, 15 months after they had landed. In 1662, a new company was formed, whoſe capital amounted only to L. 8750. By the aſſiſtance of the miniſtry they expelled the Dutch, who had taken poſſeſſion of the iſland, and ſettled themſelves much more comfortably than their predeceſſors. In 1667 the iſland was taken by the Engliſh, and in 1676 by the Dutch, but afterwards reſtored to the French; and ſince that time it has never been attacked. Soon after ſome pirates laden with the ſpoils they had gathered in the South Seas, came and fixed their reſidence at Cayenne; reſolving to employ the treaſures they had acquired in the cultivation of the lands. In 1688, Ducaſte, an able ſeaman, arrived with ſome ſhips from France, and propoſed to them the plundering of Surinam. This propoſal exciting their avarice, the pirates betook themſelves to their old trade, and almoſt all the reſt followed their example. The expedition, however, proved unfortunate. Many of the aſſailants were killed, and all the reſt taken priſoners, and ſent to the Caribbee Iſlands. The iſland is about 45 miles in circumference and lies at the mouth of the Amazon. By a particular formation, uncommon in iſlands, the land is higheſt near the water ſide, and low in the middle. Hence the land is ſo full of moraſſes, that all communication between the different parts of it is impoſſible, without taking a great circuit. There are ſome ſmall tracts of an excellent ſoil to be found in it, but in general it is dry, ſandy, and ſoon exhauſted. Since the expulſion of the Dutch above noticed, the French have extended their colony to the continent, for near 300 miles inland; and 240 along the coaſt of Guiana, meeting Amazonia on the S. Surinam on the W. and the Atlantic on the E. and N.: thus inſtead of this ſettlement being merely an iſland, it is an extenſive province of South America; of which the iſland is only a part. The province extends from Lon. 50° to 55° W. and from the line to Lat. 5° N. The firſt produce of Cayenne was the arnotto; from the culture of which, the coloniſts proceeded to that of cotton, indigo, and laſtly to that of ſugar. The coffee tree was brought from Surinam in 1721, by ſome deſerters from Cayenne, who thus purchaſed their pardon. Cocoa was planted 10 or 12 years after. In 1752, there were exported from Cayenne 260,541 pounds of arnotto, 80,363 pounds of ſugar, 17,919 pounds of cotton, 26,881 pounds of coffee, 91,916 pounds of cocoa, 618 for timber and 104 planks.

(3.) Cayenne, the capital of the iſland, (N° 1.) is defended by a covert way, a large ditch, a very good mud rampart, and 5 baſtions. In the middle of the town is a pretty conſiderable eminence, of which a redoubt has been made, called the *Fort*. The entrance into the harbour is through a narrow channel; the ſhips can only get in at high water through the rocks and reefs, that are ſcattered about this paſs. Lon. 52. 15. W. Lat. 4. 56. N.

CAYES, or Les Cayes, a ſea port on the S. ſide of Hiſpaniola, 39 miles W. by S. of St Louis Lat. 18. 12. N.

CAYET, Cardinal. See Cajetan.

CAYLEY, a town near Otley, Yorkſhire.

CAYLOMA, a diſtrict of Peru, containing the mountains ſo named, famous for their ſilver mines, which are ſtill rich, though long wrought; ſituated about 96 miles E. of Arequipa.

CAYLUS, Count de, Marquis de Sternay, Baron de Branſac, was born at Paris 1692. He was the eldeſt ſon of John count de Caylus, lieutenant general of the French armies, by the Marchioneſs de Villette. His parents were very careful of his education. The former inſtructed him in the profeſſion of arms: the latter foſtered the virtues of his mind; a taſk ſhe diſcharged with ſingular ſucceſs. The amiable qualities of the mother appeared in the ſon, but with a bold and military air. In his natural temper he was gay and ſprightly, but had an invincible averſion to the ſervitude of a court. He was only 12 years of age when his father died at Bruſſels in 1704. He entered into the corps of the *Mouſquetaires*; and in his firſt campaign in 1709, he diſtinguiſhed himſelf by his valour in ſuch a manner, that Louis XIV. commended him before all the court, and rewarded him with an enſigncy in the *Gendarmerie*. In 1711, he commanded a regiment of dragoons, and ſignalized himſelf in Catalonia. In 1713, he was at the ſiege of Fribourg, where he was expoſed to imminent danger in the bloody attack of the covert way. Upon the peace of Raſtadt, he travelled into Italy; where antiquity ſtill affords ſo many objects to improve taſte. After a year's abſence, he returned to Paris with ſo ſtrong a paſſion for travelling, as induced him to quit the army. He ſet out for the Levant, arrived at Smyrna, and viſited the ruins of Epheſus. From the Levant, he was recalled in February 1717, by the tenderneſs of his mother. From that time he left not France, but to make two excurſions to London. The academy of painting and ſculpture adopted him an honorary member, in 1731; and the count, who loved to realize *titles*, ſpared neither labour, credit, nor fortune, to inſtruct, aſſiſt, and animate the artiſts. He wrote the lives of the moſt celebrated painters and engravers, that have done honour to this illuſtrious academy; and collected in 3 different works, new ſubjects for the painter, which he had met with in the works of the ancients. He ſaw with regret, that the works of the ancient painters, which have been diſcovered in our times, were effaced almoſt as ſoon as they were drawn from their ſubterraneous manſions. A fortunate accident furniſhed him with the means of ſhowing the compoſition and the colouring of the pictures of ancient Rome. The coloured drawings which the famous Bartoli had taken there from antique pictures, fell into his hands. He had them engraved; and before he enriched the French king's cabinet with them, he gave an edition of them at his own expence. It is the moſt extraordinary book of antiquities that ever appeared. The whole is painted with inimitable purity and preciſion. There were only 30 copies publiſhed. He engaged in an enterpriſe ſtill more intereſting to the French nation. Colbert had framed the deſign of engraving the Roman antiquities, that are ſtill to be ſeen in the ſouth of France. By his orders Mignard the architect had made drawings of them, which count de Caylus had the good fortune to recover. He reſolved to finiſh the work begun by Colbert, and to dedicate it to that great miniſter; and ſo much had he this enterpriſe at heart, that he was employed in it during his laſt illneſs, and warmly recommended it to M. Mariette. In 1742, the Count was admitted honorary member of the Academy of Belles Lettres. Amidſt his reſearches, nothing ſeemed more flattering to him than his diſcovery of ENCAUSTIC PAINTING. A deſcription of Pliny's, but too conciſe a one to give him a clear view of the matter, ſuggeſted the idea of it. He availed himſelf of the ſkill of Dr Magault, an excellent chemiſt in Paris, and by repeated experiments found out the ſecret of incorporating wax with divers tints and colours, and of making it obedient to the pencil. Pliny mentions two kinds of encauſtic painting practiſed by the ancients; one performed with wax, and the other upon ivory, with hot punches of iron. It was the former that count Caylus had the merit of reviving; and M. Muntz afterwards made many experiments to carry it to perfection. In the hands of Count Caylus, literature and the arts lent each other mutual aid. He publiſhed about 40 diſſertations in the Memoirs of the Academy of Belles Lettres. The artiſts he was particularly attentive to; and to prevent their falling into miſtakes from an ignorance of coſtume, which the ableſt of them have ſometimes done, he founded a prize of 500 livres, the object of which is to explain, by means of authors and monuments, the uſages of ancient nations. That he might enjoy with the whole world the treaſures he had collected, he cauſed them to be engraved, and gave a learned deſcription of them in a work which he embelliſhed with 800 plates. The ſtrength of his conſtitution ſeemed to give him hopes of a long life: but a humour ſettling in one of his legs, which entirely deſtroyed his health, he expired on the 5th of Sept. 1765. His monument, in the chapel of St Germain l'Auxerrois, is perfectly the tomb of an antiquary. It was an ancient ſepulchral antique, of the moſt beautiful porphyry, with ornaments in the Egyptian taſte. From the moment he procured it, he had deſtined it to grace the place of his interment. While he awaited the fatal hour, he placed it in his garden, where he uſed to look upon it with a tranquil but thoughtful eye, and pointed it out to the inſpection of his friends. In ſociety, he had all the frankneſs along with the politeneſs of a ſoldier. Born independent, he applied to ſtudies which ſuited his taſte. His heart was yet better than his abilities. In his walks he uſed frequently to try the honeſty of the poor, by ſending them with a piece of money to get change for him. In theſe caſes he enjoyed their confuſion at not finding him; and then preſenting himſelf, uſed to commend their honeſty, and give them double the ſum. He ſaid frequently to his friends, "I have this day loſt a crown; but I was ſorry that I had not an opportunity of giving a ſecond. The beggar ought not to want integrity."

CAYMAN, in zoology, a ſpecies of crocodile found in the ſouthern parts of America, and on the coaſt of Guinea. The Braſilians call it *Jacare*. See LACERTA.

CAYNE, a town SW. of Leſkaid, Cornwall.

CAYNHAM, near Stotterdon, Shropſhire.

CAYO, a village in Caermarthenſhire.

CAYSO, a town in Bedfordſhire.

CAYSTER, or CAYSTRUS, in ancient geography, a river of Ionia, whoſe mouth Ptolemy places between Colophon and Epheſus; commended by the poets for its ſwans, which it had in great numbers. Its ſource was in the Montes Cilbiani.

CAYSTRIANI CAMPI, plains of Lydia, lying in the middle between the inland parts and mount Tmolus.

CAYSTRIUS CAMPUS, a part of the territory of Epheſus.

(1.) CAYUGA, a lake of the United States, in New York, on the N. branch of the Suſquehanna, 35 miles long and 2 broad. It lies 9 miles E. of Seneca Lake, and its waters flow at its N. extremity into Seneca river.

(2.) CAYUGA INDIANS, a tribe of about 500 North Americans, one of the ci-devant Six Nations, of whom 40 reſide in the United States, and the reſt in Canada. They receive from the State of New York an annuity of 2,300 dollars, beſides 50 to one of their chiefs, as a compenſation for lands ſold by them to the State; and 500 dollars from the United States, by the treaty of 1794. Their reſervation lands lie on both ſides of the above lake, at its N. end.

CAZEROM, or } a city of Aſia in Perſia. Lon.
CAZERON, } 70. E. Lat. 29. 15. N.

CAZIC, or CAZIQUE, a title given by the Spaniards to the petty kings, princes, and chiefs of the ſeveral countries of America; excepting thoſe of Peru, which are called *curatas*. The French call them *caſiques*, a denomination which they always give to the Tartarian hords. The cazics, in ſome places, act as phyſicians, and in others as prieſts, as well as captains. The dignity of cazic among the Chiites, in S. America, does not deſcend to children, but muſt be acquired by valour and merit. One of the prerogatives annexed to it is, that the cazic may have 3 wives, while the other people are allowed only one. Mexico comprehended a great number of provinces and iſlands, which were governed by caziques, dependent on and tributary to the emperor.—Thirty of theſe vaſſals are ſaid to have been ſo powerful, that they were able each of them, to bring an army of 100,000 men into the field.

CAZIMI, in Arabian aſtronomy, the centre of the ſun.

CAZIMIR, a handſome town of Poland, in the palatine of Lublin, ſituated on a hill covered with trees; 10 miles from Belgitz. Lon. 22. 3. E. Lat. 51. 8. N.

CAZIQUE, or CACIQUE. See CAZIC.

CEANCI, CANGI, or CANGANI, ancient Britons, concerning whoſe ſituation antiquaries have been much perplexed. Cambden diſcovered ſome traces of them in many different diſtant places, as in Somerſetſhire, Wales, Derbyſhire, and Cheſhire; and he might have found as plain veſtiges of them in Devonſhire, Dorſetſhire, Eſſex, Wiltſhire, &c. But Mr Baxter obſerves, that the Ceangi were not a diſtinct nation ſeated in one particular place, but ſuch of the youth of many different nations, as were employed in paſturage, in feeding the flocks and herds of their reſpective tribes. Almoſt all the ancient nations of Britain, had their ceangi, the keepers of their flocks and herds, who ranged about the country in great numbers, as they were invited by the ſeaſon and plenty of paſture for their cattle. This is the reaſon that veſtiges of the name are to be found in many different parts of Great Britain; but chiefly in thoſe moſt fit for paſturage. Naturally brave, and rendered hardy by their way of life, they were conſtantly armed for the protection of their flocks from wild beaſts; and theſe arms they occaſionally employed in the defence of their country and their liberty.

CEANOTHUS, NEW JERSEY TEA, in botany, a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 43d order, *Dumoſæ*. There are 5 petals, pouched and arched. The fruit is a dry, trilocular, and triſpermous berry. There are 3 ſpecies, of which the moſt remarkable is the

CEANOTHUS AMERICANUS, a native of moſt parts of N. America, from whence the ſeeds have been imported into Europe. In England this plant ſeldom riſes more than 3 feet high. The ſtem, which is of a pale brown colour, ſends out branches from the bottom. Theſe are thin, flexible, and of a reddiſh colour, which has occaſioned this tree to be called *Red Twig*. The leaves ſtand on reddiſh pedicles, about half an inch in length. They are oval, ſerrated, pointed, about 2½ inches long, are proportionably broad, and have 3 nerves running lengthwiſe. From the footſtalk to the point they are of a light green colour, grow irregularly on the branches, and not oppoſite by pairs, as has been aſſerted. They are late in the ſpring before they ſhoot. The flowers grow at the ends of the twigs in cluſters: They are of a white colour, and when in blow give the ſhrub a moſt beautiful appearance. Indeed, it ſeems to be almoſt covered with them, as there is uſually a cluſter at the end of nearly every twig: and the leaves which appear among them ſerve as ornaments only, like myrtle in a diſtant noſegay: They have no ſmell. This tree blows in July; and the flowers are ſucceeded by ſmall browniſh fruit, in which the ſeeds ſometimes ripen in England. It is propagated by layers; or from ſeeds ſown in pots of compoſt, conſiſting of two parts of virgin earth well tempered and one part ſand, about a quarter of an inch deep. The young ſeedlings muſt be defended from extreme cold in winter, as well as from the parching drought in ſummer. The beſt time of layering is in ſummer, juſt before they begin to flower: At that time lay the tender twigs of the ſpring ſhoots in the earth, and nip off the end which would produce the flowers. Within 15 months ſome of them will be rooted. At the ſtools, however, the plants ſhould remain until the ſpring, when they ſhould be taken off, and the beſt rooted and the ſtrongeſt may be planted in a dry ſoil and well ſheltered place, where they are to remain; while the weakeſt ſhould be planted in pots; and if theſe are plunged into a moderate warmth of dung, it will promote their growth, and make them good plants before autumn. In winter they ſhould be guarded againſt the froſts, and in the ſpring they may be planted out where they are to remain.

* CEASE. *n. ſ.* [from the verb.] Extinction; failure: perhaps for *deceaſe*.—

The *ceaſe* of majeſty
Dies not alone, but, like a gulph, withdraws
What's near it, with it. *Shak.*

(1.) * *To* CEASE. *v. a.* [*ceſſer*, Fr. *ceſſo*, Latin.] To put a ſtop to; to put an end to.—

The diſcord is complete, nor can they *ceaſe*
The dire debate, nor yet command the peace. *Dryden.*

(2.) * *To* CEASE. *v. n.* 1. To leave off; to ſtop; to give over; to deſiſt: with *from* before a noun.—

The lives of all, who *ceaſe from* combat, ſpare;
My brother's be your moſt peculiar care. *Dryd.*

2. To fail; to be extinct; to paſs away.—The poor man ſhall never *ceaſe* out of the land. *Deut.* —The ſoul being removed, the faculties and operations of life, ſenſe and intellection *ceaſe* from that *moles corporea*, and are no longer in it. *Hale.*

3. To be at an end.—

But now the wonder *ceaſes* ſince I ſee
She kept them only, Tityrus, for thee. *Dryden.*

4. To reſt.—The miniſters of Chriſt have *ceaſed* from their labours. *Spratt.*

* CEASELESS. *adj.* [from *ceaſe*.] Inceſſant; continual; perpetual; without pauſe; without ſtop; without end.—

All theſe with *ceaſeleſs* praiſe his works behold,
Both day and night. *Milton.*

CEBBE, a river in the Iſle of Man.

CEBES, of Thebes, a Socratic philoſopher, author of the admired *Tables*: or, *Dialogues on the birth, life, and death of Mankind*. He flouriſhed about A. A. C. 405. The above piece is mentioned by Lucian, D. Laertius, Tertullian, and Suidas: but of Cebes himſelf we have no account, ſave that he is once mentioned by Plato, and once by Xenophon. The former ſays of him, in his *Phædo*, that he was a ſagacious inveſtigator of truth, and never aſſented without the moſt convincing reaſons; the latter, in his *Memorabilia*, ranks him among the few intimates of Socrates, who excelled the reſt in innocence of life.

(1.) CEBU, a river in the Weſt of Africa, which runs into the weſtern ocean.

(2.) **Cebu**, one of the moſt ſoutherly of the Philippine iſlands. It lies between thoſe of Layte and Negro.

CECERIL. See Cedilla.

(1.) **CECIL**, a county of Maryland, in the Eaſtern Shore, and in the NE. corner of the ſtate: bounded on the N. by Pennſylvania; on the W. by the Suſquehanna and Cheſapeak Bay; on the S. by the Saſſafras, which ſeparates it from Kent county; and, on the E. by the ſtate of Delaware. It is 24 miles long, and 23 broad; and contains 10,218 free inhabitants, and 3407 ſlaves. The lands though hilly, are fertile. The chief town is Elkton.

(2.) **Cecil**, William, Lord Burleigh treaſurer of England, in the reign of queen Elizabeth, was the ſon of Richard Cecil, Eſq; maſter of the robes to king Henry VIII. He was born in his grandfather's houſe, at Bourn in Lincolnſhire, in 1520; and received the rudiments of his education at Grantham. About 1535, he was entered of St John's College, Cambridge. At the age of 16 he read a ſophiſtry lecture, and at 19 a voluntary Greek lecture, which was the more extraordinary, as the Greek language was not then much cultivated. In 1541 he went to London, with an intention to ſtudy law; but O'Neil, a famous chief coming to court, with two Roman Catholic chaplains, Mr Cecil, in viſiting his father, had a warm diſpute with them in Latin, in which he diſplayed uncommon abilities. Henry, being informed of it, ordered the young man into his preſence, and was ſo pleaſed with his converſation, that he commanded his father to find a place for him. He accordingly requeſted the reverſion of the *cuſtos brevium*, worth L. 210 a-year. About this time he married the ſiſter of Sir John Cheke. Soon after king Edward's acceſſion, Mr Cecil came into the poſſeſſion of his office. His firſt lady dying in 1543, he married the daughter of Sir Anthony Cook. In 1547, he was appointed maſter of requeſts by the protector, Somerſet; and ſoon after, attended his noble patron on his expedition againſt the Scots, and was preſent at the battle of Muſſelburgh, on the 10th of Sept. 1547, when Cecil's life was miraculouſly preſerved by a friend, who in puſhing him out of the level of a cannon, had his arm ſhattered to pieces. In 1548, Mr Cecil was made ſecretary of ſtate; but in 1549, the duke of Northumberland's faction prevailing, he ſuffered in the diſgrace of the protector, and was ſent priſoner to the Tower. After 3 months confinement he was releaſed; in 1551 reſtored to his office; and ſoon after knighted, and ſworn of the privy council. In 1553, he was made chancellor of the Order of the Garter. On the death of Edward VI. Mr Cecil prudently refuſed to have any concern in Northumberland's attempt in favour of the unfortunate Lady Jane Grey; and when queen Mary acceded to the throne, he was graciouſly received at Court; but not chuſing to change his religion, he was diſmiſſed from his employments. During this reign, he was twice elected knight of the ſhire for Lincoln; and often ſpoke in the houſe of commons, with great freedom and firmneſs, in oppoſition to the miniſtry. Nevertheleſs, though a proteſtant and a patriot, he had the addreſs to ſteer through a very dangerous ſea without ſhipwreck. Q. Elizabeth's acceſſion, in 1558, diſpelled the cloud which had obſcured his fortunes. During the horrid reign of her ſiſter, he had conſtantly correſponded with princeſs Elizabeth. On the day of her acceſſion, he preſented her with a paper containing 12 articles neceſſary for her immediate diſpatch; and in a few days, was ſworn of the privy council and made ſecretary of ſtate. His firſt advice to the queen was, to call a parliament; and the firſt buſineſs he propoſed, was the eſtabliſhment of a national church. A plan of reformation was accordingly drawn up under his immediate inſpection, and the legal eſtabliſhment of the church of England was the conſequence. His next important concern, was to reſtore the value of the coin, which had in the preceding reigns been conſiderably debaſed. In 1561, he was appointed maſter of the wards; and, in 1571, created baron of Burleigh, as a reward for his ſervices, particularly in having lately ſtifled a formidable rebellion in the north. In 1561, he was honoured with the garter, and raiſed to the office of Lord High Treaſurer of England. From this period we find him the *primum mobile* of every material tranſaction during the glorious reign of Q. Elizabeth. Notwithſtanding the temporary influence of other favourites, Lord Burleigh was the perſon in whom ſhe chiefly confided in matters of importance. Having filled the higheſt and moſt important offices of the ſtate for 40 years, and guided the helm of government during the moſt glorious period of Engliſh hiſtory, he died 4th Aug. 1598, aged 78. Notwithſtanding his long enjoyment of ſuch lucrative employments, he left only an eſtate of L. 4000 *per annum*, 11,000 in money, and effects worth L. 14,000. He lived, indeed, in a manner ſuitable to his high rank. He had 4 places of reſidence, and at Theobalds, his favourite ſeat, he often entertained the queen at vaſt expence. He was doubtleſs a man of ſingular abilities and prudence; amiable in his private character, and one of the moſt able, upright, and indefatigable miniſters recorded in the Engliſh annals. His principal works are, 1. *La Complainte de l'ame percbereſſe*, or the Complaint of a ſinful Soul: in French verſe, in the king's library. 2. Materials for Pattens *Diarium, exped. Scoticæ.* London 1541, 12mo. 3. Slanders and lies maliciouſly, groſsly, and impudently vomited out, in certain traiterous books and pamphlets, againſt two counſellors, Sir Francis Bacon and Sir William Cecil. 4. A ſpeech in parliament; 1562: Strype's Mem. vol. iv. p. 107. 5. Precepts or directions for the well ordering of a man's life; 1634: Harl. Cat. vol. ii. p. 755. 6. Meditations on the death of his lady: Ballard's Mem. p. 184. 7. Meditations on the ſtate of England during the reign of Q. Elizabeth; M. S. 8. The execution of juſtice in England for the maintenance of public and Chriſtian peace, &c. Lond. 1581, 1583, Somer's tracts, 4th collect. vol. i. p. 5. 9. Advice to Q. Elizabeth in matters of religion and ſtate; ib. p. 101. 16. 10. A great number of letters. See Peck's *Deſiderata Curioſa*, Howard's collections, &c. 11. Several pedigrees, ſome of which are preſerved in the Abp. of Canterbury's library at Lambeth: n° 299, 747.

CECILIA, St, the patroneſs of muſic has been honoured as a martyr ever ſince the 5th century. Her ſtory as delivered by the notaries of the Roman church, is, that ſhe was a Roman lady born of noble parents, about A. D. 235. That her parents married her to a young pagan nobleman, named Valerianus; who going to bed on her wedding night, was told by his ſpouſe, that ſhe was nightly viſited by an angel, and that he muſt forbear to approach her, otherwiſe the angel would deſtroy him. Valerianus deſired that he might ſee his rival the angel; but his ſpouſe told him that was impoſſible, unleſs he would conſent to become a Chriſtian. This he conſented to, and was baptized by Pope Urban I; after which returning to his wife, he found her in her cloſet at prayer, and by her ſide, the angel in the ſhape of a beautiful young man, clothed with brightneſs. After ſome converſation with the angel, Valerianus told him, that he had a brother named Tiburtius, whom he wiſhed to partake of the grace which he himſelf had received. The angel told him that his deſire was granted, and that they ſhould be both crowned with martyrdom in a ſhort time. Upon this the angel vaniſhed, and his prophecy was ſoon fulfilled: Tiburtius was converted, and he and his brother were beheaded. Cecilia was offered her life if ſhe would ſacrifice to the Roman idols; but ſhe refuſed; upon which ſhe was thrown into a caldron of boiling water; others ſay that ſhe was ſtifled in a dry bath, i. e. an incloſure, from whence the air was excluded, having a ſlow fire underneath. There is a tradition of St Cecilia, that ſhe excelled in muſic; and that the angel was drawn from the celeſtial regions by the charms of her melody. This has been deemed authority ſufficient for making her the patroneſs of muſic. The above legend has given occaſion to painters and ſculptors to exerciſe their genius in repreſentations of her playing on the organ or harp.

CECILSTON, a town in Cork, Ireland.

* CECITY. *n. ſ.* [*cæcitas*, Lat.] Blindneſs; privation of ſight.—They are not blind, nor yet diſtinctly ſee; there is in them no *cecity*, yet more than a cecutiency; they have ſight enough to diſcern the light, though not perhaps to diſtinguiſh objects or colours. *Brown's Vulgar Errours.*

CECROPES, an ancient Athenian tribe. See ATTICA, § 4.

CECROPIA, in botany, a genus of the diandria order, belonging to the diœcia claſs of plants; and in the natural method ranking under the 53d order, Scabridæ.

CECROPS I. } kings of Athens. See ATTICA,
CECROPS II. } § 6. Cecrops I. flouriſhed about the time of Moſes; A. M. 2304.

* CECUTIENCY. *n. ſ.* [*cæcutio*, Lat.] Tendency to blindneſs; cloudineſs of ſight.—There is in them no cecity, yet more than a *cecutiency*. *Brown's Vulgar Errours.*

(1.) * CEDAR. *n. ſ.* *zedrus*, Lat.] A tree.—It is evergreen; the leaves are much narrower than thoſe of the pine tree, and many of them produced out of one tubercle, reſembling a painter's pencil: it hath male flowers, or catkins, produced at remote diſtances from the fruit on the ſame tree. The ſeeds are produced in large cones, ſquamoſe and turbinated. The extenſion of the branches is very regular in *cedar* trees; the ends of the ſhoots declining, and thereby ſhewing their upper ſurface, which is conſtantly cloathed with green leaves, ſo regularly as to appear at a diſtance like a green carpet, and, in waving about make an agreeable proſpect. It is ſurpriſing that this tree has not been more cultivated in England for it would be a great ornament to barren bleak mountains even in Scotland, where few other trees would grow; it being a native of Mount Libanus, where the ſnow continues moſt part of the year. Maundrel, in his Travels, ſays, he meaſured one of the largeſt *cedars* on Mount Libanus, and found it to be 12 yards 6 inches in circumference, and ſound. At about 5 or 6 yards from the ground, it was divided into 5 limbs, each of which was equal to a great tree. The wood of this famous tree is accounted proof againſt the putrefaction of animal bodies. The ſaw-duſt is thought to be one of the ſecrets uſed by the mountebanks, who pretend to have the embalming myſtery. This wood is alſo ſaid to yield an oil, which is famous for preſerving books and writings, and the wood is thought by Bacon to continue above 1000 years.

(2.) CEDAR, in botany. See JUNIPERUS.

(3.) CEDAR, BASTARD. See THEOBROMA.

(4.) CEDAR OF BUSACO. See CUPRESSUS.

(5.) CEDAR OF LEBANON, called by the ancients *cedrus magna*, or the great cedar; alſo *cedrelate*, Κεδρελατη. See § 1. and PINUS.

(6.) CEDAR, WHITE. See CUPRESSUS.

CEDAR-CREEK, a ſmall river of Virginia, in the county of Rockbridge, which paſſes under a remarkable natural bridge, and falls into James river. See BRIDGE, § 1. N° 10.

CEDARIA, the gum or roſin that iſſues from the cedar. *Aſh.*

CEDAR-POINT, a port of Maryland, in Charles county, E. of the Potomac, 12 miles below port Tobacco, and 96 S. by W. of Baltimore. Its trade lies chiefly in tobacco and Indian corn. The annual exports, 30th Sept. 1794, amounted to 18,593 dollars.

CEDARS, an iſland of N. America on the coaſt of California, abounding with cedar trees.

CEDONGA, a town of Naples, at the foot of the Appenines, 12 miles NW. of Melfi. Lon. 15. 38. E. Lat. 41. 5. N.

CEDRELA, in botany, a genus of the monogynia order, in the pentandria claſs of plants; and ranking, according to the natural method, under the 54th order, Miſcellaneæ. There is only one ſpecies.

CEDRENUS, George, a Grecian monk, who lived in the 11th age, and wrote "Annals, or an abridged Hiſtory, from the beginning of the World to the reign of Iſaac Comnenus emperor of Conſtantinople, who ſucceeded Michael IV. in 1059." There is an edition of it printed at Paris in 1647, with the Latin verſion of Xylander, and the notes of father Goar, a Dominican.

* CEDRINE. *adj.* [*cedrinus*, Lat.] Of or belonging to cedar.

CEDRUS, the CEDAR-TREE, MAHOGANY, &c. See JUNIPERUS, PINUS, and SWIETENIA.

(1.) CEFALONIA, or CEPHALONIA, a conſiderable iſland of Greece, in the Mediterranean;

S. of Albania; and NW. of the Morea. It is fertile, and produces excellent Muſcadine wine and oil. The climate is warm, and the trees bloſſom throughout the year. It belonged to the republic of Venice, but was ceded to France by the treaty of Campo Formio, in 1797. It was anciently called CEPHALENIA.

(2.) CEFALONIA, the capital of the above iſland. Lon. 20. 36. E. Lat. 38. 22. N.

CEFALU, a ſmall city of Sicily, in the valley of Demona, anciently called CEPHALOEDIS. It is a biſhop's ſee, and has a harbour and fort. Lon. 13. 58. E. Lat. 41. 56. N.

CEFAYA, a town on the coaſt of Africa.

CEGINUS, a fixed ſtar of the 3d magnitude in the left ſhoulder of BOOTES.

CEIBA. See BOMBAX, § I. N° 1, 3.

* *To* CEIL. *v. a.* [from *cælo*, Lat.] To overlay, to cover the inner roof of a building.—And the greater houſe he *ceiled* with fir-tree, which he overlaid with fine gold. 2 *Chron.*

(1.) * CEILING. *n. ſ.* [from *ceil.*] The inner roof.—Varniſh makes *ceilings* not only ſhine, but laſt. *Bacon.*

(2.) CEILING, in architecture, the top or roof of a lower room; or a covering of plaſter, over laths nailed on the bottom of the joiſts that bear the floor of the upper room; or where there is no upper room on joiſts for the purpoſe; hence called *ceiling joiſts*. Plaſtered ceilings are much uſed in Britain, more than in any other country. They make the room lightſome; ſtop the paſſage of the duſt; leſſen the noiſe over head; and, in ſummer, make the air cooler. See ARCHITECTURE, *Ind.*

(3.) CEILING, in ſea language, the inſide planks of a ſhip.

CEIMELIA, [from κειμαι, to be laid up,] in antiquity, precious pieces of furniture or ornaments, reſerved for extraordinary occaſions and uſes. Sacred garments, veſſels, &c. are reputed of the ceimelia of a church. Medals, antique ſtones, figures, M.SS. records, &c. are the ceimelia of men of letters.

CEIMELIARCHIUM, the repoſitory or place where ceimelia are preſerved.

CEIMELIOPHYLAX, [from κειμηλιον and φυλαττω, *I keep*,] the keeper or curator of a collection of ceimelia; an officer in the ancient churches or monaſteries; called alſo CHARTOPHYLAX.

CELÆNÆ, in ancient geography, the capital of Phrygia Magna, ſituated on a mountain, at the common ſources of the Meander and Marſyas. The king of Perſia had a ſtrong palace beneath the citadel, by the ſprings of the Marſyas, which roſe in the market place, not leſs in ſize than the Meander, and flowed through the city. Cyrus the younger had alſo a palace there, but by the ſprings of the Meander, which river paſſed likewiſe through the city. He had alſo an extenſive park, full of wild beaſts, and watered by the Meander, which ran through the middle. Xerxes is ſaid to have built theſe palaces and the citadel after his return from Greece. Antiochus Soter removed the inhabitants of Celænæ into a city, named from his mother, Apamea; which became afterwards a mart inferior only to Epheſus. See APAMEA, N° 2.

(1.) * CELANDINE. *n. ſ.* [*chelidoneum*, Lat.] A plant.—The ſwallows uſe *celandine*, the linnet euphragia. *More.*

(2.) CELANDINE, in botany. See CHELIDONIUM.

(3.) CELANDINE, LESSER. See RANUNCULUS.

(4.) CELANDINE TREE. See BOCCONIA.

(1.) CELANO, a lake of Naples in Abruzzo.

(2.) CELANO, a town of Naples, a mile from the above lake, anciently called FUCINUS. Lon. 13. 39. E. Lat. 41. 56. N.

CELARENT, among logicians, a mode of ſyllogiſm, wherein the major and concluſion are univerſal negative propoſitions, and the minor an univerſal affirmative: *e. g.*

cE None whoſe underſtanding is limited can be omniſcient.
lA Every man's underſtanding is limited.
rEnt Therefore no man is omniſcient.

CELASTRUS, in botany, the STAFF TREE, a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 43d order, Dumoſæ. The corolla is pentapetalous and patent: the capſule quinquangular and trilocular; the ſeeds veiled. There are 11 ſpecies; two of which are enured to our climate: viz.

1. CELASTRUS BULLATUS, an uncertain deciduous ſhrub, a native of Virginia. It is about 4 feet high, riſing from the ground with ſeveral ſtalks, which divide into many branches, and are covered with a browniſh bark. The leaves are a fine green; alternate; oval ſhaped, and have their edges undivided. The flowers are produced in July, at the ends of the branches, in looſe ſpikes. They are of a white colour, and in their native countries are ſucceeded by beautiful ſcarlet fruit; but with us this ſeldom happens. Theſe plants are eaſily propagated from ſeeds ſown, about an inch deep, in beds of good freſh mould made fine. They ſeldom come up until the 2d, and ſometimes not before the 3d ſpring. They are alſo propagated by layers; which muſt be performed on the young wood, in the autumn, by a ſlit at the joint. Theſe layers may be expected to ſtrike root by the autumn following; when they may be taken up and planted in the nurſery-ground. They muſt be well ſheltered, otherwiſe the leaves are apt to fall off. As they grow naturally in moiſt places they do not thrive in a dry ſoil.

2. CELASTRUS SCANDENS, OR BASTARD EUONYMUS, with woody, twining ſtalks, riſing by the help of neighbouring trees to 12 feet. The leaves are oblong, ſerrated, of a pleaſant green, pale, and veined underneath, and grow alternately. The flowers are produced in ſmall bunches, from the ſides of the branches, near the ends. They are of a greeniſh colour, appear in June; and are ſucceeded by roundiſh, red, three-cornered capſules, containing ripe ſeeds, in autumn. This ſpecies is hardy, and makes a fine appearance among other trees in autumn, by its beautiful red berries, which are produced in vaſt profuſion on the tops of other trees, to the height of which theſe plants by twiſting, aſpire. They ſhould not be planted near weak or tender trees, to climb on; for they embrace the ſtalks ſo cloſely as to deſtroy any but the hardieſt trees and ſhrubs. This ſpecies is propagated, 1. By laying down the young ſhoots in the ſpring. By the autumn

they will have ſtruck root, and may then be taken off and ſet in the places where they are to remain. 2. By ſeeds; which ſhould be ſoon ſown after they are ripe, otherwiſe they will be 2 or 3 years before they come up. When they make their appearance, nothing more need be done them to keep them clear from weeds all ſummer and the winter following; and in ſpring the ſtrongeſt plants may be drawn out, and ſet in the nurſery for a year, and then removed to the places where they are to remain; whilſt the weakeſt, being left in the ſeed-bed one year more may undergo the ſame diſcipline. In Senegal the negroes uſe the powder of the root as a ſpecific againſt gonorrhœas, which it is ſaid to cure in 8, or ſometimes in 3 days. An infuſion of the bark of a ſpecies of ſtaff tree, which grows in the Iſle of France, is ſaid to poſſeſs the ſame virtues.

* CELATURE. *n. ſ.* [*cælatura*, Lat.] The art of engraving, or cutting in figures.

CELBRIDGE, a town of Ireland, in Kildare, Leinſter, on the banks of the Liffey, 10 miles from Dublin. It has a manufacture of chip hats.

CELE, a tumour.

CELEBES. See Macassar.

* *To* CELEBRATE. *v. a.* [*celebro*, Lat.] 1. To praiſe; to commend; to give praiſe to; to make famous.—The ſongs of Sion were pſalms and pieces of poetry, that adored or *celebrated* the Supreme Being. *Addiſon.*—I would have him read over the *celebrated* works of antiquity, which have ſtood the teſt of ſo many different ages. *Addiſon.* 2. To diſtinguiſh by ſolemn rites; to perform ſolemnly.—He ſlew all them that were gone to *celebrate* the ſabbath. 2 *Maccabees.* 3. To mention in a ſet or ſolemn manner, whether of joy or ſorrow.—

This pauſe of pow'r, 'tis Ireland's hour to mourn;
While England *celebrates* your ſafe return.
Dryden.

CELEBRATED, *adj.* famous; renowned.

* CELEBRATION. *n. ſ.* [from *celebrate.*] 1. Solemn performance; ſolemn remembrance.—He laboured to drive ſorrow from her, and to haſten the *celebration* of their marriage. *Sidney.*—During the *celebration* of this holy ſacrament, you attend earneſtly to what is done by the prieſt. *Taylor.* 2. Praiſe; renown; memorial.—No more ſhall be added in this place, his memory deſerving a particular *celebration*, than that his learning, piety and virtue, have been attained by few. *Clarendon.*

* CELEBRIOUS. *adj.* [*celeber*, Lat.] Famous; renowned; noted. Not in uſe.—The Jews, Jeruſalem, and the Temple, having been always ſo *celebrious;* yet when, after their captivities, they were deſpoiled of their glory, even then, the Aſſyrians, Greeks, and Romans, honoured with ſacrifices, the moſt high God, whom that nation worſhipped. *Grew.*

* CELEBRIOUSLY. *adv.* [from *celebrious.*] In a famous manner.

* CELEBRIOUSNESS. *n. ſ.* [from *celebrious.*] Renown; fame.

* CELEBRITY. *n. ſ.* [*celebritas*, Lat.] Publick and ſplendid tranſaction.—The manner of her receiving, and the *celebrity* of the marriage, were performed with great magnificence. *Bacon.*

CELEF, a river of Algiers, which, after a courſe of 18 or 20 leagues, falls into the ſea about three leagues W. from the city of Algiers. It is ſuppoſed to be the Carthena of the ancients.

CELERES, [from *celer*, quick.] in Roman antiquity, a regiment of body guards belonging to the Roman kings, eſtabliſhed by Romulus, and compoſed of 300 young men, choſen out of the moſt illuſtrious Roman families, and approved by the ſuffrages of the curiæ of the people, each of which furniſhed ten. The celeres always attended near the king's perſon, to guard him and to execute his orders. In war, they made the van-guard in the engagement, which they always began firſt; in retreats, they made the rear-guard. Though they were a body of horſe, yet they uſually diſmounted, and fought on foot; their commander was called *tribune*, or prefect of the celeres. They were divided into three troops, of 100 each, commanded by a centurion; their tribune was the ſecond perſon in the kingdom. Plutarch ſays, Numa broke the celeres. If this be true, they were ſoon re-eſtabliſhed; for we find them under moſt of the ſucceeding kings. Brutus, who overturned the monarchy, was tribune of the celeres.

CELERI. See Apium, N° 1. and Celery.

(1.) * CELERIACK. *n. ſ.* A ſpecies of parſley; it is alſo called *turnip-rooted parſley.*

(2.) Celeriack, in botany, a variety of the Apium. See Apium, § I, N° 1. It ſhould be managed in the ſame manner as celery, (See Celery, § 2.) excepting that this ſhould be planted on the level ground, or in very ſhallow drills: for this plant ſeldom grows above 8 or 10 inches high, ſo requires but little earthing up; the great excellency of this ſpecies being in the ſize of the root, which is often as large as ordinary turnips.

(1.) * CELERITY. *n. ſ.* [*celeritas*, Lat.] Swiftneſs; ſpeed; velocity.—His former cuſtom and practice was ever full of forwardneſs and *celerity*, to make head againſt them. *Bacon.*—Three things concur to make a percuſſion great; the bigneſs, the denſity, and the *celerity* of the body moved. *Digby.*—Whatever increaſeth the denſity of the blood, even without increaſing its *celerity*, heats, becauſe a denſer body is hotter than a rarer. *Arbuthnot on Aliments.*

(2.) Celerity, in mechanics, the ſwiftneſs of any body in motion. It is alſo defined to be an affection of motion, by which any moveable body runs through a given ſpace in a given time.

(1.) * CELERY. *n. ſ.* A ſpecies of *parſley;* which ſee.

(2.) Celery, in botany, the Engliſh name of a variety of the Apium Graveolens. The ſeed of celery ſhould be ſown at 2 or 3 different times, the better to continue it for uſe through the whole ſeaſon, without running up to ſeed. The firſt ſowing ſhould be in the beginning of March, upon a gentle hot-bed; the ſecond may be at the end of the ſame month, which ought to be in an open ſpot of light earth, where it may enjoy the benefit of the ſun; the third time of ſowing ſhould be in the latter end of April, or beginning of May, on a moiſt ſoil; and if expoſed to the morning ſun only, it will be ſo much the better, but it ſhould not be under the drip of trees. In the middle of May, ſome of the plants of the firſt ſowing will be fit to tranſplant for blanching. The manner of tranſplanting is as follows: After having cleared the ground of weeds, dig a trench by a line about ten inches wide, and 8 or 9 inches deep, looſening the earth in the bottom, and laying it level. The earth that comes out of the trench ſhould be equally laid on each ſide of it to be ready to draw in again, to earth the celery as it advances. Theſe trenches ſhould be made 3 feet diſtant from each other; then place the plants in the middle of the trench, about 4 or 5 inches diſtant, in one ſtraight row, having before trimmed the plants, and cut off the tops of the long leaves: As they are planted, cloſe the earth well to their roots, and water them plentifully until they have taken new root. As they advance in height, draw the earth cloſe on each ſide, taking care not to bury their hearts, otherwiſe they will rot. When the plants have advanced a conſiderable height above the trenches, and all the earth, which was laid on the ſides thereof, has been employed in earthing them up, make uſe of a ſpade to dig up the earth between the trenches. This muſt be continued from time to time, until they are fit for uſe. The laſt crop ſhould be planted in a dry ſoil, to prevent rotting in winter. Cover the ridges with peaſe haulm, or ſome ſuch light covering, when the froſt is very hard, which will admit the air to the plants; for if covered too cloſe, they will rot. The celery may thus be preſerved till ſpring; but take off the covering whenever the weather will permit, otherwiſe it will cauſe the celery run to ſeed. The celery when full blanched, will not continue good above 3 or 4 weeks, before it will rot or pipe; therefore to continue it good, one ſhould have at leaſt, 6 or 7 different ſeaſons of planting, proportioned to the conſumption. The beſt method to ſave the ſeed of celery is to chooſe ſome long good roots of the upright celery, which have not been too much blanched, and plant them out, about a foot aſunder, in a moiſt ſoil, early in ſpring; and when they run up to ſeed, keep them ſupported with ſtakes to prevent their being broken down with the wind: and in July, when the ſeed begins to form, if that ſeaſon ſhould prove very dry, it will be proper to give ſome water to the plant, which will greatly help its producing good ſeeds. In Auguſt theſe ſeeds will be ripe, at which time it ſhould be cut up, in a dry time, and ſpread upon cloths in the ſun to dry; then beat out the ſeeds, and preſerve it in bags for uſe.

(3.) CELERY, WILD, *Apium Antarcticum*, was found in conſiderable quantities by Mr Banks and Dr Solander, on the coaſt of Terra del Fuego. It is like the garden celery in the colour and diſpoſition of the flowers, but the leaves were of a deeper green. The taſte is between that of celery and parſley. It is a very uſeful ingredient in ſoup for ſeamen, becauſe of its antiſcorbutic quality.

(1.) * CELESTIAL. *adj.* [*celeſtis*, Lat.] 1. Heavenly; relating to the ſuperior regions.—The ancients commonly applied *celeſtial* deſcriptions of other climes to their own. *Brown.* 2. Heavenly; relating to the bleſſed ſtate.—

> Play that ſad note
> I nam'd my knell; whilſt I ſit meditating
> On that *celeſtial* harmony I go to. *Shakeſp.*

3. Heavenly, with reſpect to excellence.—

> Canſt thou pretend deſire, whom zeal inflam'd
> To worſhip, and a pow'r *celeſtial* nam'd? *Dryd.*
> Telemachus, his bloomy face,
> Glowing *celeſtial* ſweet, with golden grace. *Pope.*

(2.) * CELESTIAL. *n.ſ.* [from the adj.] An inhabitant of heaven.—

> Thus affable and mild, the prince precedes,
> And to the doom th' unknown *celeſtial* leads. *Pope.*

* CELESTIALLY. *adv.* [from *celeſtial.*] In a heavenly manner.

* *To* CELESTIFY. *v. a.* [from *celeſtial*, Lat.] To give ſomething of heavenly nature to any thing. Not uſed.—We ſhould affirm, that all things were in all things, that heaven were but earth terreſtrified, and earth but heaven *celeſtified*, or that each part above had influence upon its affinity below. *Brown's Vulgar Errours.*

CELESTIN, the name of 5 popes of Rome; of whom the moſt remarkable was,

CELESTIN V. whoſe original name was Peter de Meuron. He was born at Iſernia, in Naples, in 1215, of mean parents. He retired, while very young, to a ſolitary mountain, to dedicate himſelf to prayer and mortification. The fame of his piety brought ſeveral, out of curioſity, to ſee him; ſome of whom, charmed with his virtues, renounced the world to accompany him in his ſolitude. With theſe he formed a kind of community in 1254; which was approved by pope Urban IV. in 1264, and erected into a diſtinct order, called the *hermits of St Damien.* Peter governed this order till 1286, when his love of ſolitude and retirement induced him to quit the charge. In July 1294, the great reputation of his ſanctity raiſed him, though much againſt his will, to the pontificate. He then took the name of Celeſtin V. and his order that of Celeſtius from him. By his bull he approved their conſtitution, and confirmed all their monaſteries to the number of 20. But he ſat too ſhort time in the chair of St Peter to do much for his order; for having governed the church 5 months and a few days, and conſidering the great burden he had taken upon him, to which he thought himſelf unequal, he ſolemnly renounced the pontificate in a conſiſtory held at Naples; and died in 1269.

CELESTINS, a religious order ſo called from their founder pope CELESTIN V. See laſt article. After his death, his order made great progreſs in Italy and France; whither the then general Peter of Tivoli ſent 12 religious, at the requeſt of Philip the Fair, who gave them two monaſteries; one in the foreſt of Orleans, and the other in that of Compiegne. This order likewiſe paſſed into ſeveral provinces of Germany. They had about 96 convents in Italy, and 21 in France, under the title of priories, before the late revolutions. The Celeſtins riſe two hours after midnight, to ſay matins. They eat no fleſh except when ſick. They faſt every Wedneſday and Friday, from Eaſter to the feaſt of the exaltation of the holy croſs; and, from the feaſt to Eaſter, every day. Their habit conſiſts of a white gown, a capuche, and a black ſcapulary. In the choir, and when they go out of the monaſtery, they wear a black cowl with the capuche: their ſhirts are of ſerge.

CELETÆ, or } [from κελης, a race horſe,] in
CELETES, } antiquity, 1. Single or ſaddle-horſes; 2. Cavaliers or riders on horſeback.

CELEUMA, or } from κελευειν, to call,] in an-
CELEUSMA, } tiquity; 1. The ſhout or cry of the ſeamen, whereby they animated each other in their work of rowing. 2. A kind of ſong or formula, rehearſed or played by the maſter or others, to direct the ſtrokes and movement of the mariners, as well as to encourage them to labour. See next article.

CELEUSTES, in ancient navigation, the boatſwain or officer appointed to give the rowers the ſignal, when they were to pull, and when to ſtop.

* CELIACK. *adj.* [κοιλια, the belly.] Relating to the lower belly. The blood moving ſlowly through the *celiack* and meſenterick arteries, produces complaints. *Arbuthnot on Aliments.*

(1.) * CELIBACY. *n. ſ.* [from *cælebs*, Latin.] Single life; unmarried ſtate.—I can attribute their numbers to nothing but their frequent marriages; for they look on *celibacy* as an accurſed ſtate, and generally are married before twenty. *Spectator.*—By teaching them how to carry themſelves in their relations of huſbands and wives, parents and children, they have, without queſtion, adorned the goſpel, glorified God, and benefited man, much more than they could have done in the devouteſt and ſtricteſt *celibacy*. *Atterbury.*

(2.) CELIBACY is derived by Scaliger from κοιτη, bed, and λειπω, *linquo*, I leave, by others from *cæli beatitudo*; q. d. *the bleſſedneſs of heaven!* The ancient Romans very wiſely uſed all means imaginable to diſcourage celibacy. Nothing was more uſual than for the cenſors to impoſe a fine on bachelors. Dionyſius Halicarnaſſenſis mentions an ancient conſtitution whereby all perſons of full age were obliged to marry. The firſt law of that kind, of which we have any certainty, is, that under Auguſtus, called *lex Julia de maritandis ordinibus*. It was afterwards denominated *Papia*, *Poppæa*, and more uſually *Julia Popia*, in regard of ſome amendments made to it under the conſuls Papius and Poppæus. By this law, divers prerogatives were given to perſons who had many children; penalties impoſed on thoſe who lived a ſingle life, as that they ſhould be incapable of receiving legacies, and not exceeding a certain proportion.

(1.) * CELIBATE. *n. ſ.* [*cælibatus*, Lat.] Single life.—The males oblige themſelves to *celibate*, and then multiplication is hindred. *Graunt.*

(2.) CELIBATE is chiefly uſed in ſpeaking of the ſingle life of the Popiſh clergy, or the obligation they are under to abſtain from marriage. In this ſenſe we ſay the law of *celibate*. Monks and religious take a vow of celibate; and what is more difficult to be kept, of *chaſtity*. The church of Rome impoſes an univerſal celibacy on all its clergy, from the pope to the loweſt ſubdeacon. The advocates for this uſage pretend, that a vow of perpetual celibacy was required in the ancient church as a condition of ordination, even from the earlieſt apoſtolic ages. But the contrary is evident from numerous examples of biſhops and archbiſhops, who lived in a ſtate of matrimony, without any prejudice to their ordination or their function. It is generally agreed that moſt of the apoſtles were married: Some ſay all of them, except St Paul and St John. Others ſays St Paul himſelf was married, becauſe he writes to his *yoke fellow*, whom they interpret his wife. Be this as it may, in the next ages after the apoſtles, we have accounts of divers married biſhops, preſbyters, and deacons, without any reproof or mark of diſhonour ſet on them; *e. g.* Valens, preſbyter of Philippi, mentioned by Polycarp; and Chæremon, biſhop of Nilus. Novatus was a married preſbyter of Carthage, as we learn from Cyprian; who himſelf was alſo a married man, as Pagi confeſſes; and ſo was Cæcilius the preſbyter who converted him; and Numidius another preſbyter of Carthage. The Romaniſts reply to this, that all married perſons, when ordained, promiſed to live ſeparate from their wives by conſent, which anſwered the vow of celibacy in other perſons. But this is not only ſaid without proof but againſt it. For Novatus preſbyter of Carthage, was certainly allowed to cohabit with his wife after ordination; as appears from the charge that Cyprian brings againſt him, that he had ſtruck and abuſed his wife, and thereby cauſed her to miſcarry. There ſeems indeed to have been, in ſome caſes, a tendency towards the introduction of ſuch a law, by one or two zealots; but the motion was no ſooner made than it was quaſhed by the authority of wiſe men. Thus Euſebius obſerves, that Pinytus, biſhop of Gnoſſus in Crete, was for laying the law of celibacy upon his bretheren; but Dionyſius biſhop of Corinth wrote to him, that he ſhould conſider the weakneſs of men, and not impoſe that heavy burden on them. In the council of Nice, A. D. 325, the motion was renewed for a law to oblige the clergy to abſtain from all conjugal ſociety with their wives, whom they had married before ordination; but Paphnutius, a famous Egyptian biſhop, and one who himſelf was never married, vigorouſly declaimed againſt it, upon which it was unanimouſly rejected. The council in Trullo, held in 692, made a difference in this reſpect between biſhops and preſbyters; allowing preſbyters, deacons, and all the inferior orders, to cohabit with their wives after ordination; and giving the Romaniſh church a ſmart rebuke for the prohibition: but at the ſame time laying an injunction upon biſhops to live ſeparate from their wives, and appointing the wives to betake themſelves to a monaſtic life, or become deaconeſſes in the church. And thus was a celibate eſtabliſhed in the Greek church, but only as to biſhops. In the Latin church, the like eſtabliſhment was alſo made, but by ſlow ſteps in many places. For in Africa, even biſhops cohabited with their wives at the time of the council of Trullo. The celibacy of the clergy, being clearly neither of divine nor apoſtolical inſtitution, it ſeems hard to conceive from what motive the court of Rome perſiſted ſo obſtinately to impoſe this inſtitution, on the clergy. But this was a leading ſtep to the execution of the project, formed of making the clergy independent of princes, and rendering them a ſeparate body, to be governed by their own laws. In fact while prieſts had children, it was very difficult to prevent their dependence on princes, whoſe favours have ſuch an influence on private men; but having no family, they were more at liberty to adhere to the Pope.

CELIDOGRAPHIA, the deſcription of the ſpots which appear on the ſurfaces of the ſun and planets. See ASTRONOMY, § 51, 190, 267.

CELIMIA, the name among the modern Greeks for CALAMINE.

(1.) * CELL. *n.ſ.* [*cella*, Lat.] 1. A ſmall cavity or hollow place.—

The brain contains ten thouſand *cells*,
In each ſome active fancy dwells. *Prior.*
How bees forever, though a monarch reign,
Their ſep'rate *cells* and properties maintain. *Pope.*

2. The cave or little habitation of a religious perſon.

Then did religion in a lazy *cell*,
In empty, airy contemplations dwell. *Denham.*

3. A ſmall and cloſe apartment in a priſon. 4. Any ſmall place of reſidence; a cottage.—

For ever in this humble *cell*
Let thee and I together dwell. *Prior.*

5. Little bags, or bladders, where fluids, or matter of different ſorts, are lodged; common both to animals and plants. *Quincy.*

(2.) CELL, (§ 1. *def.* 2.) is alſo uſed for a leſſer or ſubordinate ſort of monaſtery dependent on a great one, by which it was erected, and continues to be governed. The great abbeys in England had moſt of them cells in places diſtant from the mother abbey, to which they were accountable, and from which they received their ſuperiors. The alien priories in England were cells to abbeys in Normandy, France, Italy, &c. The name was alſo given to rich monaſteries not dependent on any other. It ſignifies alſo a little apartment, wherein the ancient monks, ſolitaries, and hermits, lived in retirement. The name is ſtill retained in various monaſteries. The dormitory is frequently divided into cells or lodges. The Carthuſians have each a ſeparate cell. The hall wherein the Roman conclave is held, is divided, by partitions, into cells, for the cardinals to lodge in.

(3.) CELL, in botany, is applied to the hollow places between the partitions in the pods, huſks, and other ſeed-veſſels of plants. According as there is 1, 2, 3, &c. of theſe cells, the veſſel is ſaid to be unilocular, bilocular, trilocular, &c.

(4.) CELL, in geography, a town of Germany, late in the electorate of Triers, in the circle of the Lower Rhine, now annexed to France, and included in the dep. of the Rhine and Moſelle; 20 miles SW. of Coblentz, on the E. ſhore of the Moſelle. Lon. 6. 45. E. Lat. 50. 10. N.

(5.) CELLS, in anatomy, (§ 1. *def.* 5.) are called LOCULI, CELLULÆ, &c. See ANATOMY, § 233.

(6.) CELLS, in bee huſbandry, the little hexagonal diviſions in honey-combs. See BEE, § I. 8.

CELLA, in ancient writers, [from *celare*, to conceal,] is uſed in various ſenſes: as, I. A place uſually under ground and vaulted, in which were ſtored up wine, honey, and the like; and according to which it was called either *Cella Vinaria*, *Olearia*, or *Mellacia*, &c. II. The lodge or habitation of a common proſtitute, as being anciently under ground, hence alſo denominated *fornix*. (See *Juv. Sat.* vi. *ver.* 121.) The names of the whores were written on the doors of their ſeveral cells; hence ſtiled *inſcriptæ*. (See *Martial. lib.* xi. *ep.* 46.) III. The bed-chamber of a domeſtic ſervant; probably as being low and narrow. IV. An apartment of a bath: Of theſe there were three principal, called *frigidaria*, *tepidaria*, and *caldaria*; to which may be added a 4th, called *cella aſſa*, or *ſudatoria*. V. The *adytum*, or moſt retired part of a temple, wherein the images of the gods were preſerved. See ADYTUM.

(1.) * CELLAR. *n.ſ.* [*cella*, Lat.] A place under ground, where ſtores and liquors are repoſited.—If this fellow had lived in the time of Cato, he would, for his puniſhment, have been confined to the bottom of a *cellar* during his life. *Peacham on Drawing.*

(2.) CELLAR differs from VAULT, as the latter is ſuppoſed to be deeper, the former being frequently little below the ſurface of the ground. Cellars, in modern building, are the loweſt rooms in a houſe, the ceilings of which uſually lie level with the ſurface of the ground on which the houſe is built; or they are ſituated under the pavement before the houſe, eſpecially in ſtreets and ſquares.

* CELLARAGE. *n.ſ.* [from *cellar.*] The part of the building which makes the cellars.—A good aſcent makes a houſe wholeſome, and gives opportunity for *cellarage*. *Mortimer's Huſb.*

CELLARDYKES, a fiſhing town on the coaſt of Fife, in Kilrenny pariſh, which formerly had 50 large boats and 300 men employed in fiſhing cod, haddocs, &c. but now greatly decayed.

CELLARER, or CELLERER, *Cellerarius*, or *Cellarius*, an officer in monaſteries, to whom belong the care and procurement of proviſions for the convent. The *cellerarius* was one of the four *obedientiarii*, or great officers of monaſteries: under his ordering was the *piſtrinum* or bakehouſe, and the *bracinum*, or brew-houſe. In the richer houſes there were particular lands ſet apart for the maintenance of his office, called in ancient writings *ad cibum monachorum*. His whole office in ancient times had a reſpect to that origin: he was to ſee his lord's corn got in, and laid up in granaries; and his appointment conſiſted in a certain proportion thereof, uſually fixed at a 13th part of the whole, together with a furred gown. The office of cellarer then only differed in name from thoſe of bailiff and minſtrel; excepting that the cellarer had the receipt of his lord's rents through the whole extent of his juriſdiction. The cellarer was alſo an officer in chapters, to whom belonged the care of the temporals, and particularly the diſtributing of bread, wine, and money, to canons for their attendance in the choir. In ſome places he was called BURSER.

* CELLARIST. *n.ſ.* [*cellarius*, Lat.] The butler in a religious houſe. *Dict.*

CELLARIUM, in antiquity, an allowance of proviſions furniſhed out of the CELLA, to the governor of the province and his officers, &c. See ANNONA, § I. Cellarium differed from PENUS, as the former was only a ſtore-houſe for ſeveral days, the latter for a long time. Thus the BACTROPERATÆ are ſaid by St Jerome to *carry cellar* about with them.

(1.) CELLARIUS, Chriſtopher, was born in 1638, at Smalcalde in Franconia, where his father was miniſter. He was ſucceſſively rector of the colleges at Weymar, Zeits, and Merſbourg; and the king of Pruſſia having founded an univerſity at Hall in 1693, he was prevailed on to be profeſſor of eloquence and hiſtory there, where he compoſed the greateſt part of his works. His great application to ſtudy haſtened the infirmities of old age; for he ſpent whole days and nights together at his books, without any attention to his health, or even the calls of nature. His works relate to grammar, geography, hiſtory, and the oriental languages, and the number of them is amazing. He died in 1707.

(2.) CELLARIUS, in ancient Roman law, an examiner of accounts and expences.

(3.) CELLARIUS. See BORRHAUS.

CELLEPORÆ, a genus of marine plants, or rather animals; a claſs of worms in the Linnæan ſyſtem. They are of the genus of the LITHOPHYTA. See CORAL.

CELLINI, Benvenuto, an eminent ſtatuary, who was bred a jeweller and goldſmith, but ſeems to have had an extraordinary genius for the fine arts in general. He was cotemporary with Michael Angelo, and Julio Romano, and was employed by popes, kings, and other patrons of arts and ſciences. Some of his productions are eſteemed moſt exquiſite. He lived to a very conſiderable old age; and his life, almoſt to the laſt, was a continued ſcene of alternate adventure, patronage, perſecution, and miſfortune, truly wonderful. He wrote his own hiſtory, which was not, however, publiſhed till 1730, probably on account of the freedom with which he therein treated many diſtinguiſhed perſonages of Italy and other countries. It was tranſlated into Engliſh by Dr Nugent in 1771, to which the reader is referred, as it will not admit of a proper abridgment. He alſo wrote treatiſes on goldſmiths' work and on caſting ſtatues.

CELLITÆ, } an order of religious, founded at
CELLITES, } Antwerp in the beginning of the
14th century. See LOLLARDS.

CELLULÆ ADIPOSÆ. See ANATOMY, § 233.

CELLULANUS, *n.ſ.* a monk or hermit.

(1.) * CELLULAR. *adj.* [*cellula*, Lat.] Conſiſting of little cells or cavities.—The urine, inſinuating itſelf amongſt the neighbouring muſcles, and *cellular* membranes, deſtroyed four. *Sharp's Surg.*

(2.) CELLULAR INTERSTICES. } See ANATOMY,
(3.) CELLULAR MEMBRANE. } *Index.*

CELOSIA, COCKS-COMB: A genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 54th order, *Miſcellaneæ.* The calyx is triphyllous; the corolla is five petalled in appearance; the ſtamina are conjoined at the baſe to the plaited nectarium; the capſule gaping horizontally. There are 8 ſpecies, of which the moſt worthy of notice is the

CELOSIA CRISTATA, or common cocks-comb, ſo called on account of its creſted head of flowers, reſembling a cock's comb; of which there are many varieties. The principal colours of their flowers are red, purple, yellow, and white; but there are ſome whoſe heads are variegated with 2 or 3 colours. The heads are ſometimes divided like a plume of feathers, and are of a beautiful ſcarlet colour. Theſe plants are very tender exotics, and require a great deal of care to cultivate them in this country. Three hot beds muſt be prepared; a ſmall one in March, on which to raiſe the plants an inch or two in height; a 2d in April, of larger dimenſions, in which to tranſplant them when proper; and a 3d in May for a large frame, to receive them tranſplanted into pots, to remain till the end of June or beginning of July to grow to full ſize: all of which hot-beds muſt be covered with frames and glaſſes, and have 5 or 6 inches depth of fine rich light earth for the reception of the ſeed and plants; and in the 2d and 3d hot bed, the frames muſt occaſionally be raiſed or augmented, according as the plants riſe in height.

CELSIA, in botany: A genus of the angioſpermia order, belonging to the tridynamia claſs of plants; and in the natural method ranking under the 28th order, *Luridæ.* The calyx is quinquepartite; the corolla wheel-ſhaped; the filaments bearded or woolly; the capſule bilocular. There is but one ſpecies, a native of Armenia.

* CELSITUDE. *n.ſ.* [*celſitudo*, Lat.] Height. *D.*

(1.) CELSUS, Aulus Cornelius, a celebrated phyſician of the firſt century, who wrote 8 books on medicine, in elegant Latin. He was the Hippocrates of the Latins, and Quintilian gives him a high eulogium. Boerhaave ſays, Celſus is one of the beſt authors of antiquity for letting us into the true meaning of Hippocrates; and that, without him, the writings of this father in phyſic would be often unintelligible, and often miſunderſtood by us. He ſhows us alſo how the ancients cured diſtempers by friction, bathing, &c. His eight books *de Medicina* have often been printed. The Elzivir edition, in 1650, by Vander Linden, is the beſt, being entirely corrected from his MSS.

(2.) CELSUS, an Epicurean philoſopher, in the 2d century. He wrote a work againſt the Chriſtians, entitled, *The True Diſcourſe;* to which Origen, at the deſire of Ambroſe his friend, wrote a learned anſwer. To this philoſopher Lucian dedicated his *Pſeudomanties.*

CELTÆ, or } an ancient nation, by which
(1.) CELTES, } moſt of the countries of Europe are thought to have been peopled. The compilers of the Univerſal Hiſtory are of opinion, that they are deſcended from Gomer the eldeſt ſon of Japhet: That Gomer ſettled in Phrygia; his ſons Aſhkenaz and Togarmah in Armenia, and Riphath in Cappadocia: That the Celtæ, took the left hand, ſpreading weſtward towards Poland, Hungary, Germany, France, and Spain; while the deſcendants of Magog, Gomer's brother, moving eaſtward, peopled Tartary. In this large European tract, the Celtes began to appear a powerful nation under ſeveral conſiderable kingdoms. Mention is made of them indeed in ſo many parts of Europe, by ancient geographers and hiſtorians, that Ortelius took *Celtica* to be a general name for the continent of Europe, and made a map of it bearing this title. In thoſe parts of Aſia, which they poſſeſſed, as well as in the different parts of Europe, the Celtes went by various names. In Leſſer Aſia they were known by the names of *Titans* and *Sacks;* in the northern parts of Europe, by thoſe of *Cimmerians, Cimbrians,* &c. and in the ſouthern parts they were called *Celtes, Gauls,* or *Galatians.* As to the government of the Celtes, all we know is, that the curetes,

retes, and afterwards druids and bards, were the interpreters of their laws; judged all cauſes criminal and civil; and their ſentence was reckoned ſo ſacred, that whoever refuſed to abide by it was excluded from aſſiſting at their ſacred rites; after which no man dared to converſe with him; ſo that this puniſhment was reckoned even ſeverer than death itſelf. They neither reared temples nor ſtatues to the deity, but deſtroyed them wherever they could find them, planting in their ſtead large ſpacious groves; which being open on the top and ſides, were in their opinion, more acceptable to the divine Being, who is abſolutely unconfined. In this their religion ſeems to have reſembled that of the Perſees and diſciples of Zoroaſter. The Celtes only differed from them in making the oak inſtead of the fir the emblem of the Deity; in chooſing that tree above all others to plant their groves with, and attributing ſeveral ſupernatural virtues both to its wood, leaves, fruit, and miſletoe; all which were made uſe of in their ſacrifices and other parts of their worſhip. But after they had adopted the idolatrous ſuperſtition of the Romans and other nations, and the apotheoſis of their heroes and princes, they came to worſhip them much in the ſame manner: as Jupiter under the name of *Taran*, which in the Celtic ſignifies thunder; Mercury, whom ſome authors call *Heus* or *Heſus*, probably from the Celtic *buadh*, which ſignifies a dog, and might be the *Anubis latrans* of the Egyptians. But Mars was held in the greateſt veneration by the warlike, and Mercury by the trading part of the nation. The care of religion was immediately under their curetes, druids, and bards. See BARDS, § 4, and DRUIDS.

(2.) CELTES, certain ancient inſtruments of a wedge-like form, of which ſeveral have been diſcovered in different parts of Great Britain. Antiquarians have generally attributed them to the Celtæ; but, not agreeing as to their uſe, diſtinguiſhed them by the above appellation. But Mr Whitaker makes it probable that they were Britiſh battle-axes. See BATTLE-AX, § 2.

(3.) CELTES, HISTORY OF THE. See GAUL.

CELTIBERI, or CELTIBERIANS, } (*i. e.* the Celtæ ſeated on the Iberus,) the inhabitants of CELTIBERIA. They were very brave and warlike, their cavalry in particular was excellent.— They wore a black rough cloak, the ſhag of which was like goats hair. Some of them had light bucklers like the Gauls; others hollow and round ones like thoſe of other nations. They all wore boots made of hair, and iron helmets adorned with creſts of a purple colour. They uſed ſwords which cut on both ſides, and poinards of a foot long. Their arms were of an admirable temper, and are ſaid to have been prepared in the following manner: they buried plates of iron under ground, where they let them remain till the ruſt had eaten the weakeſt part of the metal, and the reſt was conſequently hard and firm. Of this excellent iron they made their ſwords, which were ſo ſtrong and well tempered, that there was neither buckler nor helmet that could reſiſt their edge. The Celtiberians were very cruel towards their enemies and malefactors, but ſhewed the greateſt humanity to their gueſts. They not only cheerfully granted their hoſpitality to ſtrangers who travelled in their country, but were deſirous that they ſhould ſeek protection under their roof.

CELTIBERIA, in ancient geography, a territory SW. of Spain, along the ſide of the river Iberus. Sometimes the greateſt part of Spain was called by this name.

CELTIC, *adj.* Belonging to the *Celtæ*.

(I.) CELTIS, in botany, the LOTE, or NETTLE TREE: a genus of the monœcia order, belonging to the polygamia claſs of plants; and in the natural method ranking under the 53d order, *Scabridæ*. It is a hermaphrodite plant: The female calyx is quinquepartite; there is no corolla; there are 5 ſtamina, and 2 ſtyles. The fruit is a monoſpermous plum. In the male, there is no calyx; the corolla is hexapetalous; there are ſix ſtamina, and an embryo of a piſtillum. There are 3 ſpecies, all of them deciduous, viz.

1. CELTIS AUSTRALIS, the Southern Celtis, a deciduous tree, a native of Africa and the ſouth of Europe.

2. CELTIS OCCIDENTALIS, the Weſtern Celtis, a native of Virginia. Theſe two ſpecies grow with large, fair, ſtraight ſtems; their branches are numerous and diffuſe; their bark is of a darkiſh grey colour; their leaves are of a pleaſant green, 3 or 4 inches long, deeply ſerrated, and in a narrow point, nearly reſemble the leaves of the common ſtinging nettle, and continue on the trees till late in the autumn: So that one may eaſily conceive what an agreeable variety theſe trees would make. Their ſhade too is admirable. The leaves are late in the ſpring before they ſhow themſelves; but they make amends for this, by retaining their verdure till near the cloſe of autumn, and then do not reſemble moſt deciduous trees, whoſe leaves ſhow their approaching fall by the change of their colour; but continue to exhibit themſelves of a pleaſant green to the laſt. Hanbury ſpeaks highly of the celtis as a timber tree: he ſays, "The wood of the lote tree is extremely durable. In Italy they make their flutes, pipes, and other wind inſtruments of it. With us the coach-makers uſe it for the frames of their vehicles." Miller mentions alſo the wood of the Occidentalis being uſed by the coach-makers.

3. CELTIS ORIENTALIS, the Eaſtern Celtis, a native of Armenia. It grows to about 12 feet; and the branches are numerous, ſmooth, and of a greeniſh colour. The leaves are ſmaller than thoſe of the others, though they are of a thicker texture, and a lighter green. The flowers come out from the wings of the leaves, on ſlender foot-ſtalks: They are yellowiſh, appear early in ſpring, and are ſucceeded by large yellow fruit.

(II.) CELTIS, CULTURE, &c. OF THE. All the 3 ſpecies are propagated from ſeeds, which ripen in England, if they have a favourable autumn; but the foreign ſeeds are the moſt certain of producing a crop. Theſe ſeeds ſhould be ſown, ſoon after they are ripe, either in boxes, or in a fine warm border of rich earth, ¼ of an inch deep; and in the following ſpring, many of the young plants will appear; though a great part often lie till the ſecond ſpring before they ſhow their heads. If the ſeeds in the beds ſhoot early in ſpring they ſhould be hooped, and protected by mats from the froſts. When all danger from froſt is over, the mats ſhould be laid aſide till the parching beams of the ſun get powerful; when, in the day time, they may be laid over the hoops again, to ſcreen the plants from injury. The mats ſhould be conſtantly taken off every night, and the young plants ſhould never be covered either in rainy or cloudy weather. During the whole ſummer, theſe ſeedlings ſhould be frequently watered in dry weather, and the beds kept clean of weeds, &c. In autumn they muſt be protected from the froſts, which often come early in that ſeaſon. The like care ſhould be continued all winter. They may remain in their beds, if kept clean of weeds, and watered in dry weather, till the end of June, when they ſhould be planted in others, at ſix inches diſtance. Hanbury ſays, he has found by repeated experience, that the plants will be then almoſt certain of growing, and will continue their ſhoots till autumn; whereas many of thoſe planted in March have frequently periſhed, and thoſe which did grow made hardly any ſhoot that year, and ſhewed the early figure of a ſtunted tree. In June, therefore, let the ground be well dug, and let the mould be rich: but the operation of removing muſt be deferred till rain comes; and if the ſeaſon ſhould be dry, this work may be poſtponed till the middle of July. After rain, let the plants be taken out of their beds, and pricked out at ſix inches diſtance from each other. The beds ſhould then be hooped, and covered with mats when the ſun ſhines; but theſe muſt always be taken away at night, as well as in rainy or cloudy weather. With this management, they will have ſhot to a good height by autumn, and have acquired ſo much hardineſs as to require no farther care than to be kept clear of weeds for 2 or 3 years; when they may be planted out, or ſet in the nurſery, to be trained up for large ſtandards. The beſt ſeaſon for planting out theſe ſtandard trees is the latter end of October, or beginning of November. The ſoil for the lote tree ſhould be light, and in good heart; and the ſituation ought to be well defended, the young ſhoots being very liable to be deſtroyed by the winter's froſts.

(1.) * **CEMENT.** *n.ſ.* [*cæmentum*, Lat.] 1. The matter with which two bodies are made to cohere; as, mortar or glue.—There is a *cement* compounded of flower, whites of eggs, and ſtones powdered, that becometh hard as marble. *Bacon.*—The foundation was made of rough ſtone, joined together with a moſt firm *cement;* upon this was laid another layer, conſiſting of ſmall ſtones and *cement. Arbuthnot.* 2. Bond of union in friendſhip.—

Let not the piece of virtue which is ſet
Betwixt us, as the *cement* of our love,
To keep it builded, be the rain to batter. *Shak.*

(2.) **Cement**, (§ 1. *def* 1.) comprehends mortar, ſolder, glue, &c. but has been generally reſtrained to the compoſitions uſed for holding together broken glaſſes, china, and earthen ware. For this purpoſe the juice of garlic is recommended as exceedingly proper, being both very ſtrong, and, if the operation is performed with care, leaving little or no mark. Quicklime and the white of an egg mixed together, and expeditiouſly uſed, are alſo very proper for this purpoſe. Dr Lewis recommends a mixture of quicklime and cheeſe, in the following manner: "Sweet cheeſe ſhaved thin and ſtirred with boiling hot water, changes into a tenacious ſlime which does not mingle with the water. Worked with freſh quantities of hot water, and then mixed upon a hot ſtone with a proper quantity of unſlacked lime, into the conſiſtence of a paſte, it proves a ſtrong and durable cement for wood, ſtone, earthen ware, and glaſs. When thoroughly dry, which it will be in two or three days, it is not in the leaſt acted upon by water. Cheeſe barely beat with quick lime, as directed by ſome of the chemiſts for luting cracked glaſſes, is not near ſo efficacious." A compoſition of the drying oil of lintſeed and white lead is alſo uſed for the ſame purpoſes, but is greatly inferior.

(3.) **Cement**, in building, is uſed to denote any kind of mortar of a ſtronger kind than ordinary. The cement commonly uſed is of two kinds; hot, and cold. The hot cement is made of roſin, bees wax, brick duſt, and chalk boiled together. The bricks to be cemented are heated, and rubbed one upon another, with cement between them. The cold cement is that above deſcribed for cementing china, &c. which is ſometimes, though rarely, employed in building. The ruins of the ancient Roman buildings are found to cohere ſo ſtrongly, that moſt people have imagined the ancients were acquainted with ſome kind of mortar, which, in compariſon of ours, might juſtly be called *cement;* and that to our want of knowledge of the materials they uſed, is owing the great inferiority of modern buildings in their durability. In 1770, M. Loriot, a Frenchman, pretended to have diſcovered the ſecret of the ancient cement, which, according to him, was no more than a mixture of powdered *quicklime*, with lime which had been long ſlacked and kept under water. The ſlacked lime was firſt to be made up with ſand, earth, brick-duſt, &c. into mortar after the common method, and about a third part of quick-lime in powder was added to the mixture. This produced an almoſt inſtantaneous petrification, ſomething like what is called the *ſetting* of alabaſter, but in a much ſtronger degree; and was poſſeſſed of many wonderful qualities needleſs to relate, ſeeing it has never been known to ſucceed with any other perſon who tried it. Dr Anderſon, in his *Eſſays on Agriculture*, has diſcuſſed this ſubject at conſiderable length, and ſeemingly with great judgment. He is the only perſon we know, who has given any rational theory of the uſes of lime in building, and why it comes to be the proper baſis of all cements. His account is in ſubſtance as follows: Lime which has been ſlacked and mixed with ſand, becomes hard and conſiſtent when dry, by a proceſs ſimilar to that which produces the natural *ſtalactites* in caverns. Theſe are always formed by water dropping from the roof. By ſome unknown and inexplicable proceſs of nature, this water has diſſolved in it a ſmall portion of calcareous matter in a *cauſtic* ſtate. As long as the water continues covered from the air, it keeps the earth diſſolved in it; it being the natural property of calcareous earths, when deprived of their fixed air, to diſſolve in water. But when the ſmall drop of water comes to be expoſed to the air, the calcareous matter contained in it begins to attract the fixable part of the atmoſphere.

In proportion as it does ſo, it alſo begins to ſeparate from the water, and to reaſume its native form the limeſtone of marble. This proceſs Dr Anderſon calls a *cryſtallization;* and when the calcareous matter is perfectly *cryſtallized* in this manner, he affirms that it is to all intents and purpoſes limeſtone or marble of the ſame conſiſtence as before: and "in this manner, (ſays he,) within the memory of man, have huge rocks of marble been formed near Matlock in Derbyſhire." If lime in a cauſtic ſtate is mixed with water, part of the lime will be diſſolved, and will alſo begin to cryſtallize. The water which parted with the cryſtallized lime, will then begin to act upon the remainder, which it could not diſſolve before; and thus the proceſs will continue, either till the lime be all reduced to an *effete*, or *cryſtalline* ſtate, or ſomething hinders the action of the water upon it. It is this cryſtallization which is obſerved by the workmen when a heap of lime is mixed with water, and left for ſome time to macerate. A hard cruſt is formed upon the ſurface, which is ignorantly called *froſting*, though it takes place in ſummer as well as in winter. If therefore the hardneſs of the lime, or its becoming a cement, depends entirely on the formation of its cryſtals, it is evident, that the perfection of the cement muſt depend on the perfection of the cryſtals, and the hardneſs of the matters which are entangled among them. The additional ſubſtances uſed in making of mortar, ſuch as ſand, brick duſt, or the like, according to Dr Anderſon, ſerve only for a purpoſe ſimilar to what is anſwered by ſticks put into a veſſel full of any ſaline ſolution, namely, to afford the cryſtals an opportunity of faſtening themſelves upon it. If therefore the matter interpoſed between the cryſtals of the lime is of a friable, brittle nature, ſuch as brick duſt or chalk, the mortar will be of a weak and imperfect kind; but when the particles are hard, angular, and very difficult to be broken, ſuch as thoſe of river or pit-ſand, the mortar turns out exceedingly good and ſtrong. Sea ſand is found to be an improper material for mortar, which Dr Anderſon aſcribes to its being leſs angular than the other kinds. That the cryſtallization may be more perfect, he alſo recommends a large quantity of water, that the ingredients be perfectly mixed together, and that the drying be as ſlow as poſſible. An attention to theſe circumſtances, he thinks, would make the buildings of the moderns equally durable with thoſe of the ancients; and from what remains of the ancient Roman works, he thinks a very ſtrong proof of his hypotheſis might be adduced. The great thickneſs of their walls neceſſarily required a vaſt length of time to dry. The middle of them was compoſed of pebbles thrown in at random, and which have evidently had mortar ſo thin as to be *poured* in among them. Thus a great quantity of lime would be diſſolved, and the cryſtallization performed in the moſt perfect manner; and the indefatigable pains and perſeverance for which the Romans were ſo remarkable in all their undertakings, leaving no room to doubt that they would take care to have the ingredients mixed together as well as poſſible. The conſequence of all this is, that the buildings formed in this manner are all as firm as if cut out of a ſolid rock; the mortar being equally hard, if not more ſo, than the ſtones themſelves. Notwithſtanding the bad ſucceſs of thoſe who have attempted to repeat M. Loriot's experiments, however, Dr Black informs us, that a cement of this kind is certainly practicable. It is done, he ſays, by powdering the lime while hot from the kiln, and throwing it into a thin paſte of ſand and water; which not ſlaking immediately, abſorbs the water from the mortar by degrees, and forms a very hard maſs. "It is plain (he adds) that the ſtrength of this mortar depends on uſing the lime hot or freſh from the kiln." By mixing together gypſum and quick lime, and then adding water, we may form a cement of tolerable hardneſs, and which apparently might be uſed to advantage in making troughs for holding water, or lining ſmall canals for it to run in. Mr Weigleb ſays, that a good mortar or cement which will not crack, may be obtained by mixing three parts of a thin magma of ſlacked lime with one of powdered gypſum; but adds, that it is only uſed in a dry ſituation. A mixture of tarras with ſlaked lime acquires in time a ſtoney hardneſs, and may be uſed for preventing water from entering. See MORTAR, and STUCCO.

(4.) CEMENT, in chemiſtry, is uſed to ſignify all thoſe powders and paſtes with which any body is ſurrounded in pots or crucibles, and which are capable by the help of fire of producing changes upon that body. They are made of various materials; and are uſed for different purpoſes, as for parting gold from ſilver, converting iron into braſs; and by cementation more conſiderable changes can be effected upon bodies, than by applying to them liquids of any kind; becauſe the active matters are then in a ſtate of vapour, and aſſiſted by a very conſiderable degree of heat.

(5.) CEMENT, uſed by engravers, jewellers, &c. is the ſame with the hot cement uſed in building, (ſee § 3.) and is uſed for keeping the metals to be engraven firm to the block, and alſo for filling up what is to be chiſſeled.

(6.) CEMENT FOR GILDING LIVE FISH. A cement, which quickly hardens in water, is deſcribed in the poſthumous works of Mr Hooke, and is recommended for gilding live craw-fiſh, carps, &c. without injuring the fiſh. The cement for this purpoſe is prepared, by putting ſome Burgundy pitch into a new earthen pot, and warming the veſſel till it receives ſo much of the pitch as will ſtick round it; then ſtrewing ſome finely powdered amber over the pitch when growing cold, adding a mixture of three pounds of linſeed oil, and one of oil of turpentine, covering the veſſel and boiling them for an hour over a gentle fire, and grinding the mixture as it is wanted with as much pumice-ſtone in fine powder as will reduce it to the conſiſtence of paint. The fiſh being wiped dry, the mixture is ſpread upon it; and the gold leaf being then laid on, the fiſh may be immediately put into water again, without any danger of the gold coming off, for the matter quickly grows hard in the water.

(1.) * *To* CEMENT. *v. a.* [from the noun.] To unite by means of ſomething interpoſed.—Liquid bodies have nothing to *cement* them: they are all looſe and incoherent, and in a perpetual flux: even

ven an heap of ſand, or fine powder, will ſuffer no hollowneſs within them, though they be dry ſubſtances. *Burnet.*

(2.) * *To* Cement. *v. n.* To come into conjunction; to cohere.—When a wound is recent, and the parts of it are divided by a ſharp inſtrument, they will, if held in cloſe contact for ſome time, reunite by inoſculation, and cement like one branch of a tree ingrafted on another. *Sharp.*

(1.) * CEMENTATION *n. ſ.* [from *cement.*] The act of cementing, or uniting with cement.

(2.) Cementation, the act of corroding, or otherwiſe changing a metal by means of a Cement.

* CEMENTER. *n. ſ.* [from *cement.*] A perſon or thing that unites in ſociety.—God having deſigned man for a ſociable creature, furniſhed him with language which was to be the great inſtrument and *cementer* of ſociety. *Locke.*

CEMENT pots, are thoſe earthen pots uſed in the cementation of metals.

(1.) * CEMETERY. *n. ſ.* [κοιμητηριον.] A place where the dead are repoſited.—The ſouls of the dead appear frequently in *cemeteries*, and hover about the places where their bodies are buried, as ſtill hankering about their old brutal pleaſures, and deſiring again to enter the body. *Addiſon.*

(2.) Cemetery. Anciently none were buried in churches or church-yards: it was even unlawful to inter in cities, and the cemeteries were without the walls. It appears from Euſebius and Tertullian, that, in the early ages, the Chriſtians aſſembled for divine worſhip in the cemeteries. Valerian confiſcated the cemeteries and other places of divine worſhip, but they were reſtored again by Gallienus. As the martyrs were buried in theſe places, the Chriſtians choſe them for building churches on, when Conſtantine eſtabliſhed their religion; and hence ſome derive the rule which ſtill obtains in the church of Rome, never to conſecrate an altar, without putting under it the relics of ſome ſaint. The practice of conſecrating cemeteries is of ſome antiquity. The biſhop walked round it in proceſſion, with the crozier or paſtoral ſtaff in his hand, the holy water pot being carried before, out of which the aſperſions were made.

* CEN, or Cin, denotes *kinsfolk;* ſo *Cinnulph* is a help to his kindred; Cinehelm, a protector of his kinsfolk; *Cinburg*, the defence of his kindred; *Cenric*, powerful in kindred. *Gibſon*

CENA, a river of Algiers. See Mina.

CENADA, or Ceneda, an ancient town of Italy, in Treviſano, with a biſhop's ſee. It was anciently called Acedum, Acedes, or Cenata, and lies between Conegliano, and Sarravalle, on the Mæſulus, at the foot of the mountains; 18 miles N. of Trevigio, and 12 S. of Belluno. It has 6 paper mills, in one of which paper is made ſimilar to that of Holland, beſides various woollen and other manufactures. Lon. 12. 26. E. Lat. 46. 2 N.

* CENATORY. *adj.* [from *ceno*, to ſup, Lat.] Relating to ſupper.—The Romans waſhed, were anointed, and wore a *cenatory* garment; and the ſame was practiſed by the Jews. *Brown.*

CENCHRAMIDEA, in botany. See Clusia.

CANCHREA, a ſea port town on the Iſthmus of Corinth.

CENCARUS, in botany: A genus of the monœcia order, belonging to the polygamia claſs of plants; and in the natural method ranking under the 4th order, Gramina. The involucrum is facinated, echinated, and biflorous. The calyx is a biflorous glume, with one floret male, and the other hermaphrodite. The hermaphrodite corolla is a pointleſs glume; there are 3 ſtamina; one ſeed; the male corolla a pointleſs glume; with 3 ſtamina.

CENDULÆ, in old records, ſhingles.

CENEGILD, in the Saxon antiquities, an expiatory mulct, paid by one who had killed a man, to the kindred of the deceaſed. The word is compounded of the Saxon *cinne*, i. e. relation, and *gild*, payment.

CENESNON, a river of France, which runs through the department of Ille and Villaine.

CENELLÆ, in old records, acorns.

CENIMAGNI, an ancient people of Britain, called alſo Iceni, who inhabited the counties of Suffolk, Norfolk, and Cambridge.

CENIS, a mountain of the Alps, which ſeparates Suſa from Morianne.

CENOBITE. See Coenobite.

* CENOBITICAL. *adj.* [κοινος and βιος.] Living in community.—They have multitudes of religious orders, black and gray, eremitical and *cenobitical*, and nuns. *Stillingfleet.*

CENOSIS, [κενωσις,] in ancient medical writings, a diſcharge of humours.

(1.) * CENOTAPH. *n. ſ.* [κενος and ταφος.] A monument for one buried elſewhere.—The Athenians, when they loſt any man at ſea, raiſed a *cenotaph*, or empty monument. *Notes on Odyſſey.*

(2.) Cenotaph, in antiquity, an empty tomb, erected by way of honour to the deceaſed. It is diſtinguiſhed from a ſepulchre, in which a coffin was depoſited. Of theſe there were two ſorts; one for thoſe who had, and another for thoſe who had not, been honoured with funeral rites in another place. The ſign, whereby honorary ſepulchres were diſtinguiſhed from others, was commonly the wreck of a ſhip, to denote the deceaſe of the perſon in ſome foreign country.

CENSAL, *n. ſ.* in commerce, a Levant broker.

CENSARIA, in old records, a houſe or farm, let *ad cenſum*, at a ſtanding rent.

CENSARII, in Doomſday Book, perſons liable to be taxed.

* CENSE. *n. ſ.* [*cenſus*, Lat.] Publick rate.—We ſee what floods of treaſure have flowed into Europe by that action; ſo that the *cence*, or rates of Chriſtendom, are raiſed ſince ten times, yea twenty times told. *Bacon.*

* *To* Cense, *v. a.* [*encenſer*, Fr.] To perfume with odour: contracted from *incenſe.*—

The Salii ſing, and *cenſe* his altars round
With Saban ſmoke, their heads with poplar bound.

(1.) * CENSER. *n. ſ.* [*encenſoir*, Fr.] 1. The pan or veſſel in which incenſe is burned.—Antoninus gave piety in his money, like a lady with a *cenſer* before an altar. *Peacham on Drawing.* 2. A pan in which any thing is burned; fire pan.—

Here's ſnip, and nip, and cut, and fliſh, and fluſh,
Like to a *cenſer* in a barber's ſhop. *Shakeſp.*

(2.) Censer, in antiquity, is chiefly uſed in ſpeaking of the Jewiſh worſhip. Among the Greeks and Romans it is more frequently called *thuribulum*, *λιβανωτις*, and *accera*. See ACERRA, N° 2. The Jewiſh cenſer was a ſmall ſort of chafing diſh, covered with a dome, and ſuſpended by a chain. Joſephus tells us, that Solomon made 20,000 gold cenſers for the temple of Jeruſalem, to offer perfumes in, and 50,000 others to carry fire in.

(1.) CENSIO, in antiquity, the act or office of the cenſor. See CENSUS. Cenſio included both the valuing a man's eſtate, and the impoſing penalties.

(2.) CENSIO HASTARIA, a puniſhment inflicted on a Roman ſoldier, for ſome offence, whereby his *haſta* or ſpear was taken from him, and conſequently his wages and hopes of preferment ſtopped.

* CENSION. *n.ſ.* [*cenſio*, Lat.] A rate, an aſſeſſment.—God intended this *cenſion* only for the bleſſed Virgin and her ſon, that Chriſt might be born where he ſhould. *Joſeph Hall.*

(1.) CENSITUS, in antiquity, a perſon entered in the cenſual tables. See CENSUS.

(2.) CENSITUS, in the civil law, a ſervile ſort of tenant, who pays capitation to his lord for the land he holds of him, and is entered as ſuch in the lord's rent-roll.

(1.) * CENSOR. *n.ſ.* [*cenſor*, Lat.] 1. An officer of Rome, who had the power of correcting manners. 2. One who is given to cenſure and exprobation.—The moſt ſevere *cenſor* cannot but be pleaſed with the prodigality of his wit, though at the ſame time, he could have wiſhed that the maſter of it had been a better manager. *Dryden.*

(2.) CENSORS, [from *cenſeo*, to ſee,] two prime magiſtrates in ancient Rome. Their buſineſs was to regiſter the effects of the Roman citizens, to impoſe taxes, and to take cognizance of the manners of the citizens. They had a power to cenſure immorality by inflicting ſome mark of ignominy on the offender. They had even a power to create the *princeps ſenatus*, and to expel from the ſenate ſuch as they deemed unworthy of that office. This power they ſometimes exerciſed arbitrarily, and therefore a law was paſſed, that no ſenator ſhould be degraded, until he had been formally accuſed and found guilty by both the cenſors. They alſo filled up the vacancies in the ſenate, upon any remarkable deficiency in their number; they let out to farm all the lands and revenues of the republic; and contracted with artificers, for building and repairing all the public works, both in Rome and the colonies of Italy. In all parts of their office, however, an appeal always lay from the ſentence of the cenſors, to that of an aſſembly of the people. The firſt two cenſors were created A. U. C. 311, upon the ſenate obſerving that the conſuls were ſo much taken up with war, as not to have time to look into other matters. Cato and his colleague Valerius conducted the buſineſs with great ſtrictneſs and impartiality. See CATO, N° 1. The office continued till the time of the emperors, who aſſumed the cenſorial power, calling themſelves *morum præfecti*; though Veſpaſian and his ſons reſumed the title of *cenſors*. Decius attempted to reſtore the dignity to a particular magiſtrate. After this we have no more of it, till Conſtantine's time, who made his brother cenſor, and he ſeems to have been the laſt that enjoyed the office. The office was ſo conſiderable, that for a long time none aſpired to it till they had paſſed all the reſt; ſo that it was thought ſurpriſing that Craſſus ſhould have been admitted cenſor, without having been either conſul or prætor. At firſt the cenſors enjoyed their dignity for 5 years, but in A. U. C. 420, the dictator Mamertinus made a law reſtraining it to a year and an half, which was afterwards obſerved very ſtrictly. At firſt one of the cenſors was elected out of a patrician, and the other out of a plebeian family; and upon the death of either, the other was diſcharged from his office and two new ones elected, but not till the next luſtrum. In 622, both cenſors were choſen from among the plebeians; and after that time the office was ſhared between the ſenate and people.—After their election in the Comitia Centuriatia, the cenſors proceeded to the capitol, where they took an oath to act equitably and impartially throughout the whole courſe of their adminiſtration. The late ariſtocratical government of Venice had a cenſor of the manners of the people, whoſe office laſted 6 months.

(3.) CENSORS OF BOOKS, a body of doctors or others, eſtabliſhed in countries, under deſpotic governments, to examine all books before they go to the preſs, upon the pretence of ſeeing that they contain nothing contrary to faith and good manners. At Paris the faculty of theology long claimed this privilege, as granted to them by the pope; but, in 1624, new commiſſions were granted, by letters patent, appointing 4 doctors the ſole cenſors of all books, and anſwerable for every thing contained in them. In Britain we had formerly an officer of this kind, under the title of *licenſer of the preſs*: but, ſince the revolution in 1688, the liberty of the preſs, one of the moſt valuable privileges of Britons, has been eſtabliſhed.

* CENSORIAN. *adj.* [from *cenſor.*] Relating to the cenſor.—As the chancery had the pretorian power for equity, ſo the ſtar-chamber had the *cenſorian* power for offences under the degree of capital. *Bacon.*

CENSORINUS, a celebrated writer in the 3d century, well known by his treatiſe *De Die Natali*; which was written about A. D. 238. Gerard Voſſius calls it *a little book of gold*; and declared it to be a moſt learned work of the higheſt uſe to chronologers, as it connects and determines, with great exactneſs, ſome of the principal æras in pagan hiſtory. It was printed at Cambridge, with the notes of Lindenbrokius, in 1695.

* CENSORIOUS. *adj.* [from *cenſor.*] 1. Addicted to cenſure; ſevere; full of invectives.—Do not too many believe no religion to be pure, but what is intemperately rigid; no zeal to be ſpiritual, but what is *cenſorious*, or vindicative? *Sprat.* 2. Sometimes it has *of* before the object of reproach.—A dogmatical ſpirit inclines a man to be *cenſorious of* his neighbours. *Watts on the Mind.* 3. Sometimes *on*.—He treated all his inferiours of the clergy with a moſt ſanctified pride; was rigorouſly and univerſally *cenſorious upon* all his brethren of the gown. *Swift.*

* CENSORIOUSLY. *adv.* [from *cenſorious.*] In a ſevere reflecting manner.

* CENSORIOUSNESS. *n. ſ.* [from *cenſorius.*] Diſpoſition to reproach; habit of reproaching.—Sourneſs of diſpoſition, and rudeneſs of behaviour, *cenſoriouſneſs* and ſiniſter interpretation of things, all croſs and diſtaſteful humours, render the converſation of men grievous and uneaſy to one another. *Tillotſon.*

* CENSORSHIP. *n. ſ.* [from *cenſor.*] 1. The office of a cenſor. 2. The time in which the office of cenſor is born.—It was brought to Rome in the *cenſorſhip* of Claudius. *Brown's Vulg. Err.*

* CENSURABLE. *adj.* [from *cenſure.*] Worthy of cenſure; blameable; culpable.—A ſmall miſtake may leave upon the mind the laſting memory of having been taunted for ſomething *cenſurable. Locke.*

* CENSURABLENESS. *n. ſ.* [from *cenſurable.*] Blameableneſs; fitneſs to be cenſured.

* CENSURE. *n. ſ.* [*cenſura*, Lat.] 1. Blame; reprimand; reproach.—

Enough for half the greateſt of theſe days,
To 'ſcape my *cenſure*, not expect my praiſe. *Pope.*

2. Judgment; opinion.—

Madam, and you, my ſiſter, will you go
To give your *cenſures* in this weighty buſineſs?
Shakeſpeare.

3. Judicial ſentence.—

To you, lord governour,
Remains the *cenſure* of this helliſh villain. *Shak.*

4. A ſpiritual puniſhment inflicted by ſome eccleſiaſtical judge.—Upon the unſucceſsfulneſs of milder medicaments, uſe that ſtronger phyſick, the *cenſures* of the church. *Hammond.*

* *To* CENSURE. *v. a.* [*cenſurer*, Fr.] 1. To blame; to brand publickly.—The like *cenſurings* and deſpiſings have embittered the ſpirits, and whetted both the tongues and pens of learned men one againſt another. *Sanderſon.* 2. To condemn by a judicial ſentence.

* CENSURER. *n. ſ.* [from *cenſure.*] He that blames; he that reproaches.—A ſtateſman, who is poſſeſt of real merit, ſhould look upon his political *cenſurers* with the ſame neglect, that a good writer regards his criticks. *Addiſ.*

(1.) CENSUS, in Roman antiquity, an authentic declaration made before the cenſors, by the people, of their reſpective names and places of abode. This was regiſtered by the cenſors; and contained an enumeration, in writing, of all the eſtates, lands, and inheritances they poſſeſſed; their quantity, quality, place, wives, children, domeſtics, tenants, and ſlaves. In the provinces the cenſus ſerved not only to diſcover the ſubſtance of each perſon, but where, and in what manner and proportion, taxes might be beſt impoſed. The cenſus at Rome is commonly thought to have been held every 5 years: but Dr Middleton has ſhown, that both cenſus and luſtrum were held at various irregular and uncertain intervals. The cenſus was an excellent expedient for diſcovering the ſtrength of the ſtate; the number of the citizens; how many were fit for war, and how many for offices of other kinds; how much each was able to pay of taxes, &c. It went through all ranks of people, though under different names: that of the common people was called *cenſus;* that of the knights, *cenſus, recenſio, recognitio;* that of the ſenators, *lectio, relectio.*—Hence it came to be uſed perſonally. See § 2.

(2.) CENSUS, applied perſonally, ſignified one who had made ſuch a declaration, (§ 1.) in which ſenſe it was oppoſed to INCENSUS, a perſon who had not given in his eſtate, or name, to be regiſtered.

(3.) CENSUS was alſo uſed for a perſon worth 100,000 ſeſterces, or who was entered as ſuch in the cenſual tables, on his own declaration. In this ſenſe, it amounts to the ſame with CLASSICUS, or a man of the firſt claſs; though Gellius limits the eſtate of ſuch, to 125,000 aſſes. By the Voconian law, no cenſus was allowed to give by his will above a 4th part of what he was worth to a woman.

(4–6.) CENSUS was alſo uſed in other ſenſes: as, I. For the book or regiſter wherein the profeſſions of the people were entered; and which was frequently cited and appealed to, as evidence in the courts of juſtice. II. A man's whole ſubſtance or eſtate. See § 10, 11. III. A tax on perſons, or a capitation tax. See CAPITE, § 3.

(7.) CENSUS DOMINICATUS, in writers of the lower age, a rent due to the lord.

(8.) CENSUS DUPLICATUS, a double rent, paid by vaſſals to their lords on extraordinary occaſions; as expeditions to the Holy Land, &c.

(9.) CENSUS ECCLESIÆ ROMANÆ, an annual contribution voluntarily paid to the ſee of Rome by the ſeveral princes of Europe.

(10.) CENSUS EQUESTER, in Roman antiquity, the eſtate of a knight, rated at 400,000 ſeſterces, which was required to qualify a perſon for that order, and without which no virtue or merit was available.

(11.) CENSUS SENATORIUS, the patrimony of a ſenator, was limited to a certain value; being at firſt rated at 800,000 ſeſterces, but afterwards, under Auguſtus, enlarged to 1,200,000.

* CENT. *n. ſ.* [*centum*, Lat. a hundred.] A hundred; as, five *per cent*, that is, five in the hundred.

(1.) * CENTAUR. *n. ſ.* [*centaurus*, Lat.] 1. A poetical being, ſuppoſed to be compounded of a man and a horſe.—Down from the waſte they are *centaurs*, though women all above. *Shakeſp.*—The idea of a *centaur* has no more falſehood in it, than the name *centaur. Locke.* 2. The archer in the zodiack.—

The cheerleſs empire of the ſky,
To Capricorn, the *Centaur* archer yields. *Thomſ.*

(2.) CENTAUR, in aſtronomy, a part of a ſouthern conſtellation, uſually joined with the wolf, See ASTRONOMY, § 548.

(3.) CENTAURS, in mythology, [from κεντειν, to gall, and ταυρος, a bull;] § 1. *def.* 1. fabulous monſters, half men and half horſes. The poets pretend that the centaurs were the ſons of Ixion and a cloud: the reaſon of which fancy is, that the people ſo named retired to a caſtle, called νεφελη, which ſignifies a cloud. Some will have the centaurs to have been a body of ſhepherds and herdſmen, rich in cattle, who inhabited the mountains of Arcadia, and to whom is attributed the invention of bucolic poetry. Palæphætus, in his book of Incredibles, relates, that in the reign of Ixion, king of Theſſaly, a herd of bulls on mount Theſſalus run mad, and ravaged the whole country, rendering the mountains inacceſſible; that ſome young men who had found out the art of taming and mounting horſes, undertook to clear the mountains of theſe animals, which they purſued on horſeback, and thence obtained the appellation of *Centaurs*. This ſucceſs rendering them inſolent, they inſulted the Lapithæ, a people of Theſſaly: and becauſe when attacked they fled with great rapidity, it was ſuppoſed they were half horſes and half men.—The Centaurs in reality were a tribe of Lapithæ, who inhabited the city Pelethronium adjoining to mount Pelion, and firſt invented the art of breaking horſes, as is intimated by Virgil.

CENTAUREA, GREATER CENTAURY: A genus of the polygamia fruſtanea order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The receptacle is briſtly, the pappus ſimple, the corollulæ of the radius funnel ſhaped, longer than thoſe of the diſk, and irregular. There are 61 ſpecies; of which we ſhall only mention two: viz.

1. CENTAUREA CYANUS, the blue bottle, grows commonly among corn. The expreſſed juice of this flower ſtains linen of a beautiful blue colour, but is not permanent. Mr Boyle ſays, that the juice of the inner petals, with a little alum, makes a beautiful permanent colour, equal to ultramarine.

2. CENTAUREA GLASTIFOLIA. The root of this ſpecies is an article in the materia medica. It has a rough, ſomewhat acrid taſte, and abounds with a red viſcid juice. Its rough taſte has gained it ſome eſteem as an aſtringent; its acrimony as an aperient; and its glutinous quality as a vulnerary: but the preſent practice takes very little notice of it.

* CENTAURY, GREATER and LESS. [*centaurium*.] Two plants.—

Add pounded galls, and roſes dry,
And with Cecropian thyme ſtrong ſcented *centaury*. *Dryden*.

(1.) CENTAURY, GREATER. See CENTAUREA.

(2.) CENTAURY, LESSER. See GENTIANA.

CENTELLA, in botany: A genus of the tetrandria order, belonging to the monœcia claſs of plants; and in the natural method ranking under the 11th order, *Sarmentoſæ*. The male involucrum is tetraphyllous and quinqueflorous, with 4 petals; the female involucrum is diphyllous and uniflorous; the petals four: the germen inferior; two ſtyles; and a bilocular ſeed-caſe.

CENTENARIO, or CENTENARIUS, in the middle age; 1. an officer who had the command, with the adminiſtration of juſtice, in a village. The centenarii were under the juriſdiction and command of the court. We find them among the Franks, Germans, Lombards, Goths, &c. 2. An officer who had the command of 100 men; more frequently called a CENTURION. 3. An officer, in monaſteries, who had the command of 100 monks.

* CENTENARY. *n. ſ.* [*centenarius*, Lat.] The number of a hundred.—In every *centenary* of years from the creation, ſome ſmall abatement ſhould have been made. *Hakewill on Providence*.

CENTININUM OVUM, [*i. e.* the 100dth egg,] among naturaliſts, a ſort of hen's egg much ſmaller than ordinary, vulgarly called a *cock's egg*; from which it has been fabulouſly held that the cockatrice is produced. The name is taken from an opinion, that theſe are the laſt eggs which hens lay, having laid 100 before. They have no yolks, but in other reſpects differ not from common ones; having the albumen, chalazes, membranes, &c. in common with others. In the place of the yolk is found a little body like a ſerpent coiled up, which doubtleſs gave riſe to the fable of the baſiliſks origin from thence. Their origin is with probability aſcribed by Hervey to this, that the yolks in the vitellary of the hen are exhauſted before the albumina.

CENTER. See CENTRE.

CENTERVILLE, a town of the United States, in Queen Anne's County, Eaſtern Shore, Maryland. It is ſeated on the S. ſide of a branch of Corſica Creek.

* CENTESIMAL. *n. ſ.* [*centeſimus*, Lat.] Hundredth; the next ſtep of progreſſion after decimal in the arithmetick of fractions.—The neglect of a few *centeſimals* in the ſide of the cube, would bring it to an equality with the cube of a foot. *Arbuthnot on Coins*.

CENTESIMATION, a milder kind of military puniſhment, in caſes of deſertion, mutiny, and the like, when only every 100dth man is executed.

CENTESIMA USURA, that wherein the intereſt in 100 months became equal to the principal: *i. e.* where the money is laid out at one per cent. per month; anſwering to what in our ſtyle would be called 12 per cent; for the Romans reckoned their intereſt not by the year, but by the month.

* CENTIFOLIOUS. *adj.* [from *centum* and *folium*, Lat.] Having an hundred leaves.

CENTILOQUIUM, a collection of 100 ſentences, opinions, or ſayings. The Centiloquium of Hermes, contains 100 aphoriſms, or aſtrological ſentences, ſuppoſed to have been written by ſome Arab, and falſely fathered on Hermes Triſmegiſtus. It is only extant in Latin, in which it has ſeveral times been printed.—The Centiloquium of Ptolemy is a famous aſtrological piece, frequently confounded with the former, conſiſting likewiſe of 100 ſentences, divided into ſhort aphoriſms.

(1.) * CENTIPEDE. *n. ſ.* [from *centum* and *pes*.] A poiſonous inſect in the Weſt Indies, commonly called by the Engliſh *forty-legs*.

(2.) CENTIPEDE WORMS, ſuch as have a great many feet, though the number does not amount to 100, as the term imports. M. Maloet mentions a man, who, for 3 years, had a violent pain in the lower part of his forehead near the root of the noſe: at length he felt an itching, and afterwards ſomething moving within his noſtril, which he brought away with his finger. It was a worm of the centipede kind, an inch and an half long, which run ſwiftly. It lived 5 or 6 days among tobacco. The patient was free of his pain ever after. Mr Littre mentioned a like caſe in 1708, of a larger centipede voided at the noſe, after it had thrown the woman, in whoſe frontal ſinus it was, into convulſions, and had almoſt deprived her of her reaſon.

CENTIPES. See SCOLOPENDRA.

CENTLIVRE, Mrs. See FREEMAN.

CENTNER. See DOCIMASTIC HUNDRED.

(1.) CENTO, a town of Italy, in the late Bologneſe, and dep. of Upper Padua.

(2.) * CENTO. *n. ſ.* [*cento*, Lat.] A compoſition formed by joining ſcrapes from other authours.—It is quilted, as it were, out of ſhreds of divers poets, ſuch as ſcholars call a *cento.* *Camd. Remains.*

(3.) CENTO, in poetry, (§ 2.) Probo Falconia wrote the life of Jeſus Chriſt in centos taken from Virgil. Alex Roſs did the like in his *Chriſtrados.*

CENTONARII, in antiquity, certain of the Roman army, who provided different ſorts of ſtuff called CENTONES, uſed to quench the fire which the enemies engines threw into the camp.

CENTORBI. See CENTURIPPI.

CENTORIPA. See CENTURIPA.

(1.) * CENTRAL. *adj.* [from *centre.*] Relating to the centre; containing the centre, placed in the centre, or middle.—There is now, and was then, a ſpace or cavity in the *central* parts of it; ſo large as to give reception to that mighty maſs of water. *Woodward's Natural Hiſtory.*

(2.) CENTRAL FORCES, the powers which cauſe a moving body to tend towards, or recede from, the centre of motion. See MECHANICS.

(3.) CENTRAL MOUNTAINS, a ridge of mountains in the NW. of America; from a lake on the S. ſide of which the Miſſiſippi takes its riſe.

(4.) CENTRAL RULE, a rule diſcovered by Mr Thomas Baker, whereby to find the centre of a circle, deſigned to cut the parabola in as many points as an equation to be conſtructed hath real roots. Its principal uſe is in the conſtruction of equations, and he hath applied it with good ſucceſs as far as biquadratics. It is chiefly founded on this property of the parabola, that, if a line be inſcribed in that curve perpendicular to any diameter, a rectangle formed of the ſegments of the inſcript is equal to the rectangle of the intercepted diameter and parameter of the axis. The central rule has the advantage over Des Cartes and De Latere's methods of conſtructing equations, that both theſe are ſubject to the trouble of preparing the equation by taking away the ſecond term.

* CENTRALLY. *adv.* [from *central.*] With regard to the centre. Though one of the feet moſt commonly bears the weight, yet the whole weight reſts *centrally* upon it. *Dryden.*

(1.) * CENTRE. *n. ſ.* [*centrum*, Lat.] The middle; that which is equally diſtant from all extremities.—If we frame an image of a round body all of fire, the flame proceeding from it would diffuſe itſelf every way: ſo that the ſource, ſerving for the *centre* there, would be round about an huge ſphere of fire and light. *Digby on Bodies.*

(2.) CENTRE OF A SPHERE, a point in the middle, from which all lines drawn to the ſurface are equal.

(3.) CENTRE OF GRAVITY, in mechanics, that point about which all the parts of a body do in any ſituation exactly balance each other.

(4.) CENTRE OF MOTION, that point which remains at reſt, while all the other parts of a body move about it.

(1.) * *To* CENTRE. *v. a.* [from the noun.] 1. To place on a centre; to fix as on a centre.—

> One foot he *centred*, and the other turn'd
> Round through the vaſt profundity obſcure.
> *Milton.*

2. To collect to a point.—He may take a range all the world over, and draw in all that wide air and circumference of ſin and vice, and *centre* it in his own breaſt. *South.*

(2.) * *To* CENTRE. *v. n.* 1. To reſt on: to repoſe on; as bodies when they gain an equilibrium.—Where there is no viſible truth wherein to *centre*, errour is as wide as men's fancies, and may wander to eternity. *Decay of Piety.* 2. To be placed in the midſt or centre.—

> As God in heav'n
> Is centre, yet extends to all; ſo thou,
> *Centring*, receiv'ſt from all thoſe orbs. *Milton.*

3. To be collected to a point.—It was atteſted by the viſible *centring* of all the old prophecies in the perſon of Chriſt, and by the completion of theſe prophecies ſince, which he himſelf uttered. *Atterbury.*

* CENTRICK. *adj.* [from *centre.*] Placed in the centre—

> Some that have deeper digg'd in mine than I,
> Say, where his *centrick* happineſs doth lie.
> *Donne.*

(1.) * CENTRIFUGAL. *adj.* [from *centrum* and *fugio*, Lat.] Having the quality acquired by bodies in motion, of receding from the centre.—They deſcribed an hyperbola, by changing the centripetal into a *centrifugal* force. *Cheyne.*

(2.) CENTRIFUGAL FORCE. See MECHANICS.

(3.) CENTRIFUGAL MACHINE, a very curious machine, invented by Mr Erſkine, for raiſing water by means of a centrifugal force combined with the preſſure of the atmoſphere. It conſiſts of a large tube of copper, &c. in the form of a croſs, placed perpendicular in the water, and reſting at the bottom on a pivot. At the upper part of the tube is a horizontal cog wheel, which touches the cogs of another in a vertical poſition; ſo that by the help of a double winch, the whole machine is moved round with very great velocity. Near the bottom of the perpendicular part of the tube is a valve opening upwards; and near the two extremities, but on the contrary ſides of the arms, or croſs part of the tube, are two other valves opening outwards. Theſe are, by the aſſiſtance of ſprings, kept ſhut till the machine is put in motion, when the centrifugal velocity of the water forces them open, and diſcharges itſelf into a ciſtern or reſervoir placed there for that purpoſe. On the upper part of the arms are two holes, which are cloſed by pieces ſcrewing into the metal of the tube. Before the machine can work, theſe holes muſt be opened, and water poured in through them till the whole tube be full; by this means all the air will be forced out of the machine, and the water ſupported in the tube by means of the valve at the bottom. The tube being thus filled with water, and the holes cloſed by their ſcrew caps, it is turned round by means of the winch, when the water in the arms of the tube acquires a centrifugal force, opens the valves near the extremities of the arms, and flies out with a velocity nearly equal to that of the extremities of the ſaid arms. The above deſcription will be eaſily underſtood by inſpecting *Plate* LX, *fig.* 8. which gives a perſpective view of the centrifugal machine, erected on board a ſhip. ABC is the copper tube. D, a horizontal cog wheel, furniſhed with 12 cogs. E, a vertical cog wheel, furniſhed with 36 cogs. F, F, the double winch. *a*, the valve near the bottom of the tube. *b, b*, the two pivots on which the machine turns. *c*, one of the valves in the croſs-piece; the other at *d*, cannot be ſeen, being on the other ſide of the tube. *e, e*, the two holes through which the water is poured into the machine. GH, the ciſtern or reſervoir. I, I, part of the ſhip's deck. The diſtance between the two valves, *c, d*, is 6 feet. The diameter of theſe valves is about 3 inches; and that of the perpendicular tube about 7 inches. If we ſuppoſe the men who work the machines can turn the winch round in 3 ſeconds, the machine will move round its axis in one ſecond; and conſequently each extremity of the arms will move with a velocity of 18.8 feet in a ſecond. Therefore a column of water of 3 inches diameter will iſſue through each of the valves with a velocity of 18.8 feet in a ſecond: but the area of the aperture of each of the valves is 7.14 inches; which being multiplied by the velocity in inches = 225.6, gives 1610.784 cubic inches, the quantity of water diſcharged through one of the apertures in one ſecond; ſo that the whole quantity diſcharged in that ſpace of time through both the apertures is = 3221.568 inches; or 193294.08 cubic inches in one minute. But 60812 cubic inches make a ton, beer meaſure; conſequently, if we ſuppoſe the centrifugal machine revolves round its axis in one ſecond, it will raiſe nearly 3 tons 44 gallons in one minute: but this velocity is certainly too great, at leaſt to be held for any conſiderable time; ſo that, when this and other deficiences in the machine are allowed for, two tons is nearly the greateſt quantity that can be raiſed by it in one minute. As the water is forced up the perpendicular tube by the preſſure of the atmoſphere, this machine cannot raiſe water above 32 feet high. An attempt was made to ſubſtitute this machine in place of the pumps commonly uſed on ſhip-board, but the labour of working was found to be ſo great as to render the machine inferior to the chain pump. A conſiderable improvement, we apprehend, would be, to load, with a weight of lead, the ends of the tubes through which the water iſſues, which would make the machine turn with a great deal more eaſe, as the centrifugal force of the lead would in ſome meaſure act the part of a fly.

(1.) * CENTRIPETAL. *adj.* [from *centrum* and *peto*, Lat.] Having a tendency to the centre; having gravity.—The direction of the force, whereby the planets revolve in their orbits, is towards their centres; and this force may be very properly called attractive, in reſpect of the central body, and *centripetal*, in reſpect of the revolving body. *Cheyne.*

(2.) CENTRIPETAL FORCE. See MECHANICS.

CENTRISCUS, in ichthyology, a genus of fiſhes belonging to the order of amphibia nantes. The head gradually ends in a narrow ſnout, the aperture is broad and flat; the belly is carinated; and the belly fins united. There are two ſpecies, viz.

1. CENTRISCUS SCOLOPAX, with a rough ſcabrous body, and a ſtraight extended tail. It has two belly fins, with 4 rays in each, but no teeth. It is found in the Mediterranean.

2. CENTRISCUS SCUTATUS has its back covered with a ſmooth bony ſhell, which ends in a ſharp ſpine under which is the tail; but the back fins are between the tail and the ſpine. It is a native of the Eaſt Indies.

CENTROBARICO, the centre of gravity.

CENTRONIA, in zoology, a name by which the ECHINI MARINI have been lately diſtinguiſhed. Dr Hill makes them a diſtinct claſs of animals living under the defence of ſhelly coverings formed of one piece, and furniſhed with a vaſt number of ſpines moveable at the creature's pleaſure.

* CENTRY. SENTRY. See SENTINEL.—

The thoughtleſs wits ſhall frequent forfeits pay,
Who 'gainſt the *centry's* box diſcharge their tea.
Gay.

CENTUMCELLÆ, in ancient geography, Trajan's villa in Tuſcany, on the coaſt, 3 miles from Algæ; with an excellent port, called *Trajanus Portus;* and a factitious iſland at the mouth of the port, made with a huge block of ſtone, on which two turrets roſe, with two entrances into the baſon or harbour. It is now called CIVITA VECCHIA. Lon. 11. 51. E. Lat. 42. 5. N.

CENTUMVIRI, in Roman antiquity, judges appointed to decide common cauſes among the people: they were choſen, 3 out of each tribe; and, though 105 in number, were called *centumviri*, from the round number *centum*, an hundred.

CENTUNCULUS, in botany, a genus of the monogynia order, belonging to the tetrandria claſs of plants; and in the natural method ranking under the 20th order, Rotaceæ. The calyx is quadrifid: the corolla quadrifid, and patent; the ſtamina are ſhort: the capſule is unilocular, cut round or parting horizontally.

* CENTUPLE. *adj.* [*centuplex*, Lat.] An hundred fold.

* *To* CENTUPLICATE, *v. a.* [*centuplicatum*, of *centum* and *plico*, Lat.] To make a hundred fold; to repeat a hundred times. *Dict.*

CENTURIATA COMITIA. See CENTURY, § 2.

* *To* CENTURIATE. *v. a.* [*centurio*, Lat.] To divide into hundreds.

* CENTURIATOR. *n. ſ.* [from *century*.] A name given to hiſtorians, who diſtinguiſh times by centuries; which is generally the method of eccleſiaſtical hiſtory.—The *centuriators* of Magdeburg were the firſt that diſcovered this grand impoſture. *Ayliffe's Parergon.*

CENTURIES OF MAGDEBURG, a famous eccleſiaſtical hiſtory, ranged into 13 centuries, carried down to the year 1298, compiled by ſeveral hundred proteſtants of Magdeburg, the chief of whom was Flaccus Illyricus.

(1.) * CENTURION. *n. ſ.* [*centurio*, Lat.] A military officer among the Romans, who commanded an hundred men.—Have an army ready, ſay you?—A moſt royal one. The *centurions*, and their charges, diſtinctly billeted in the entertainment, and to be on foot at an hour's warning. *Shakeſp.*

(2.) CENTURIONS, in Roman antiquity. See

Manipulus. Every one of the 30 manipuli in a legion was divided into two *ordines*, or centuries. Every manipulus was allowed two centurions, one to each century: and, to determine the point of priority between them, they were created at two different elections. The 30 who were made firſt always took the precedency of their fellows; and therefore commanded the right hand orders, as the others did the left. The triarii, had their centurions elected firſt, next to them the principes, and afterwards the haſtati. *Primi ordines* is ſometimes uſed in hiſtorians for the centurions of theſe orders; and the centurions are ſometimes ſtyled *principes ordinum*, and *principes centurionum*. Theſe diſtinctions afforded a wide field for promotion: firſt through all the orders of the haſtati; then through the principes; and afterwards from the laſt order of the triarii to the primipilus, the moſt honourable of the centurions. See Primipilus.

CENTURIPA, CENTURIPE, or Centoripa, in ancient geography, a town on the SW. of the territory of Etna, on the river Cyamoſorus: Now called Centurippi. It was a democratical city, which, like Syracuſe, received its liberty from Timoleon. Its inhabitants cultivated the fine arts, particularly ſculpture and engraving. It was taken by the Romans, plundered and oppreſſed by Verres, deſtroyed by Pompey, and reſtored by Octavius, who made it the reſidence of a Roman colony.

CENTURIPPI, or Centorbi, an ancient city of Italy. See laſt article. In digging for the remains of antiquities, cameos are no where found in ſuch abundance as at Centurippi and its environs. The ſituation of the place is romantic: it is built on the ſummit of a vaſt group of rocks, which was probably choſen as the moſt difficult of acceſs, and conſequently the ſafeſt in times of civil commotion. The remains ſtill exiſting of its ancient bridge are a proof of its having been once a conſiderable city, as Cicero ſpeaks of it.

(1.) * CENTURY. *n. ſ.* [*centuria*, Lat.] 1. A hundred; uſually employed to ſpecify time: as, the ſecond *century*.—The nature of eternity is ſuch, that, though our joys, after ſome *centuries* of years, may ſeem to have grown older, by having been enjoyed ſo many ages, yet will they really ſtill continue new. *Boyle*. 2. It is ſometimes uſed ſimply for a hundred.—Romulus, as you may read, did divide the Romans into tribes, and the tribes into *centuries* or hundreds. *Spenſer*.

(2.) Century, in antiquity. The Roman people, when aſſembled for electing magiſtrates, enacting laws, or deliberating upon any public affair, were always divided into centuries, and voted by centuries, that their votes might be the more eaſily collected, whence theſe aſſemblies were called COMITIA CENTURIATA. The Roman cohorts were alſo divided into centuries. See Centurion, and Cohort.

(3.) Century, in literary hiſtory. The marquis of Worceſter publiſhed a *Century* of Inventions, for a ſpecimen of which, ſee Acoustics, Sect. V. § 1; and Dr Hooke has given a *decimate* of inventions, as a part of a *Century*, of which he affirmed himſelf maſter.

CENTUSSIS, in Roman antiquity, a coin containing 100 aſſes.

CENTZONTLI, in ornithology, the Mexican name of the *Turdus polyglottus*. See Turdus.

CENU, a town of S. America, in Terra Firma, 8 miles S. of Carthagena. Lon. 75. 24. W. Lat. 10. 19. N.

CEODES, in botany: A genus of the diœcia order, belonging to the polygamia claſs of plants. There is no calyx; the corolla is monopetalous, with a ſhort turbinated tube; the ſtamina are ten ſubulated filaments; the antheræ roundiſh.

* CEOL. An initial in the names of men, which ſignifies a ſhip or veſſel, ſuch as thoſe that the Saxons landed in. *Gibſon*.

CEORLES, one of the claſſes into which the people were diſtinguiſhed among the Anglo-Saxons. The ceorles, who were perſons completely free, and deſcended from a long race of freemen, conſtituted a middle claſs between the labourers and mechanics (who were generally ſlaves, or deſcended from ſlaves) on the one hand, and the nobility on the other. They might go where they pleaſed, and purſue any way of life that was moſt agreeable to their humour; but ſo many of them applied to agriculture, and farming the lands of the nobility, that a ceorl was the moſt common name for a huſbandman or farmer in the Anglo-Saxon times. They ſeem in general to have been a kind of gentleman farmers; and if any one of them acquired the property of 5 hides of land, upon which he had a church, a kitchen, a bell-houſe, and a great gate, and obtained a ſeat and office in the king's court, he was eſteemed a nobleman or thane. If a ceorl applied to learning, and attained to prieſt's orders, he was alſo conſidered as a thane; his *weregild*, or price of his life, was the ſame, and his teſtimony had the ſame weight in a court of juſtice. When he applied to trade, and made three voyages beyond ſea, in a ſhip of his own, and with a cargo belonging to himſelf, he was alſo advanced to the dignity of a thane. But if a ceorl inclined to arms, he became the *ſithcundman*, or military retainer, to ſome potent and warlike earl, and was called the *huſcarle* of ſuch an earl. If one of theſe huſcarles acquitted himſelf ſo well as to obtain from his patron either 5 hides of land, or a gilt ſword, helmet and breaſt plate, as a reward of his valour, he was likewiſe conſidered as a thane. Thus the temple of honour ſtood open to theſe ceorles, whether they applied to agricultue, commerce, letters, or arms, which were then the only profeſſions eſteemed worthy of a freeman.

CEOS, Cea, Cia, or Cos, in ancient geography, one of the Cyclades, oppoſite to Sunium, in Achaia. It is 50 miles in compaſs, and is commended by the ancients for its fertility and richneſs of its paſture. The firſt ſilk ſtuffs, according to Pliny Solinus, were wrought here. Ceos was particularly famous for excellent figs. It was firſt peopled by Ariſtæus, the ſon of Apollo and Cyrene, who, being grieved for the death of his ſon, Actæon, retired from Thebes, at the perſuaſion of his mother, and went over with ſome Thebans to Ceos, at that time uninhabited. Diodorus Siculus tells us, that he retired to the iſland of Cos; but the ancients, as Servius obſerves, called both theſe iſlands by the name of Cos. Be that as it will, Ceos became ſo populous, that a law was made, commanding all perſons upwards of 60 to be poiſoned, that others might be able to ſubſiſt: ſo that none above 60 were ſeen to be in the iſland; being obliged, after they arrive at that age, either to ſubmit to the law, or abandon the country, together with their effects. Ceos had, in former times, 4 famous cities, viz. Julis, Carthæa, Coreſſus, and Præeſſa. The two latter were, according to Pliny, ſwallowed up by an earthquake. The other two flouriſhed in Strabo's time. Carthæa ſtood on a riſing ground, at the end of a valley, about 3 miles from the ſea. The ſituation of it agrees with that of the preſent town of Zia, which gives name to the whole iſland. The ruins both of Carthæa and Julis are ſtill remaining; thoſe of the latter take up a whole mountain, and are called by the modern inhabitants Polis, that is, *the city*. See Polis. Ceos was, with the other Greek iſlands, ſubdued by the Romans, and beſtowed upon the Athenians by Marc Antony the triumvir, together with Ægina, Tinos, and ſome other adjoining iſlands, which were all reduced to one Roman province by Veſpaſian. The iſland is now called Zia.

CEPA, the Onion. See Allium.

CEPCROU, Cape, a promontory on the coaſt of the iſland of Cayenne.

CEPHALALGIA. See Medicine, *Index*.

CEPHALALGY. *n. ſ.* [κεφαλαλγία.] The headach. *Dict.*

CEPHALANTHUS, button-wood, a genus of the monogynia order, belonging to the tetrandria claſs of plants: and in the natural method ranking under the 48th order, *Aggregatæ*. There is no common calyx; the proper one is ſuperior, and funnel ſhaped; the receptacle globoſe and naked, with one downy ſeed. There is only one ſpecies, viz.

Cephalanthus occidentalis, a deciduous ſhrub, native of North America. It grows to about 5 or 6 feet high; and is not a very buſhy plant, as the branches are always placed thinly in proportion of the ſize of the leaves, which will grow more than 3 inches long, and 1½ broad, if the trees are planted in a proper ſoil. The leaves ſtand oppoſite by pairs on the twigs, and ſometimes by threes, and are of a light-green colour: Their upper ſurface is ſmooth; they have a ſtrong nerve running from that on each ſide to the borders. Theſe, as well as the footſtalk in autumn dye a reddiſh colour. The flowers, which are aggregate, are produced at the ends of the branches, in globular heads, in July. The florets which compoſe theſe heads are funnel ſhaped, of a yellow colour, and faſtened to an axis in the middle. Theſe plants are propagated from ſeeds, from America. They ſhould be ſown as ſoon as they arrive, and there ſhall be a chance of their coming up the firſt ſpring; though they often lie till the 2d ſpring before they make their appearance. They may be ſown in good garden mould of almoſt any ſoil: if ſomewhat moiſt the better; and ſhould be covered about a quarter of an inch deep. This ſhrub is alſo propagated by layers. If the young ſhoots are laid in autumn, they will have ſtruck good root by the autumn following, and may be then taken up, and ſet in the places where they are deſigned to remain. Cuttings of this tree, alſo, planted in the autumn in a rich, light, moiſt ſoil, will grow: and by that means alſo plenty of theſe plants may be ſoon obtained.

(1.) CEPHALENIA, or Cephallenia, an iſland of the Ionian ſea, between Ithacar and Zacynthus, known in Homer's time by the names of Samos and Epirus Melæna. It is about 80 m. long, 40 broad, and 130 in compaſs. It had anciently 4 cities. Strabo tells us, that in his time there were only two cities remaining; but Pliny ſpeaks of 3, adding, that the ruins of Same, the metropolis, which had been deſtroyed by the Romans, were ſtill in being. The names of the 4 cities were, according to Thucydides, Same, Prone, Cranii, and Palæ. This iſland was ſubdued by the Thebans, under Amphitryo, who is ſaid to have killed Pterelas, who then reigned in it. While Amphitryo was carrying on the war in Cephalenia, then called Samos, Cephalus, having accidentally killed his wife Procris, fled to Amphitryo, who pitying his caſe, received him kindly, and made him governor of the iſland, which thenceforth was called *Cephalenia.* After it had been long ſubject to the Thebans, it fell under the Macedonians, and was taken from them by the Ætolians, who held it till it was reduced by M. Fulvius Nobilior; who, having gained the metropolis after a ſiege of 4 months, ſold all the citizens for ſlaves, adding the whole iſland to the dominions of Rome. It is now called Cefalonia.

(2.) Cephalenia, a town in the iſland, N° 1.

(1.) * CEPHALICK. *adj.* [κεφαλη.] That which is medicinal to the head.—*Cephalick* medicines are all ſuch as attenuate the blood, ſo as to make it circulate eaſily through the capillary veſſels of the brain. *Arbuthnot on Aliments.*—I dreſſed him up with ſoft folded linen, dipped in a *cephalick* balſam. *Wiſeman.*

(2.) Cephalic medicines comprehend cordials, with whatever promotes a free circulation of the blood through the brain. Except when the diſorder ariſes from exceſs of heat, of an inflammatory diſpoſition in the head, moiſt topicals, ſhould never be uſed; but always dry ones. To rub the head after it is ſhaved proves an inſtantaneous cure for a cephalalgia, a ſtuffing of the head, and a weakneſs of the eyes, ariſing from a weak and relaxed ſtate of the fibres.

(3.) Cephalic vein, in anatomy, creeps along the arm between the ſkin and the muſcles, and divides it into two branches; the external goes down to the wriſt, where it joins the baſilica, and turns up to the back of the hand; the internal branch, together with a ſmall one of the baſilica, makes the mediana. See Anatomy, *Index*. The ancients uſed to open this vein for diſorders of the head, for which reaſon it bears this name; but a better acquaintance with the circulation of the blood informs us, that there is no foundation for ſuch a notion.

CEPHALOEA, the headach.

CEPHALOMANTIA, [from κεφαλη, a head, and μαντεια, divination,] an ancient ſpecies of divination, by a dead man's ſkull.

CEPHALONIA. See Cefalonia.

CEPHALONOMANTIA, [from κεφαλα, Ονος, an aſs, and μαντεια,] a method of divination, by an aſs's head broiled on the coals. After muttering ſaying a few prayers, the names of ſeveral perſons ſuſpected of a theft, or the like, were repeated over; he at whoſe name the aſs's jaws made any motion, was held convicted.

CEPHALO-PHARYNGÆUS. See ANATOMY, § 203, and 219, *Note*, S.

CEPHALOPONIA, [from κεφαλη, and πονος, pain,] the head-ach.

CEPHALOTES. See VESPERTILIO.

CEPHALUS, in fabulous hiſtory, an Athenian hero, who married Procris, the daughter of Pandion, king of Athens. Ovid repreſents him as having been ſo beautiful, that Aurora fell in love with him; but at the ſame time, as ſo conſtant to his wife, that even the charms of the roſy goddeſs could not prevail on him to break his nuptial vow: whereupon Aurora changed his form to that of another man. His wife gave him a javelin, which had the peculiar property of never miſſing its aim;—a property which proved fatal to herſelf;—for, one day being out in a wood, where he was hunting, he, miſtaking her among the ruſtling leaves, for a wild beaſt, killed her with it. Ovid narrates his adventures at large, with the metamorphoſis of his dog into a ſtone, &c. *Metam. Lib.* VII. *Fab.* 25—28. See CEPHALENIA.

CEPHAS, a name given to St Peter.

(1.) CEPHEUS, in aſtronomy, a conſtellation of the northern hemiſphere. See ASTRONOMY, § 548.

(2.) CEPHEUS, in fabulous hiſtory, a king of Arcadia, on whoſe head Minerva faſtening one of Meduſa's hairs, he was rendered invincible.

CEPHISUS, a river of European Turkey, in Livadia, which falls into the lake Copai.

CEPHUS, a ſpecies of monkey. See SIMIA.

CEPITES, a ſpecies of mocoa ſtone, deſcribed by Pliny.

CERACHATES, a ſpecies of yellow agate, obtained from the E. Indies.

CERAM, an iſland in the Indian ocean, and one of the Moluccas, ſituated W. of New Guinea, and N. of Amboyna and Banda. It is about 150 miles long, and 60 broad. The Dutch have a fortreſs in it, to keep the natives in ſubjection. Lon. from 126° to 129° E. Lat. 2. 0. S.

CERAMBYX, in zoology, a genus of inſects of the beetle kind, belonging to the order of inſecta coleoptera. The antennæ are long and ſmall; the breaſt is ſpinous or gibbous; and the elytra are linear. Linnæus enumerates 83 ſpecies, chiefly diſtinguiſhed by the figure of the breaſt.

CERAMIUM, the ſame with AMPHORA.

(1.) * CERASTES. *n. ſ.* [κεραστης.] A ſerpent having horns, or ſuppoſed to have them.—

Scorpion, and aſp, and amphiſbena dire,
Ceraſtes horn'd, hydrus, and elops drear. *Milt.*

(2.) CERASTES, in zoology, the trivial name of a ſpecies of ANGUIS and COLUBER.

CERASTIUM, MOUSE-EAR: A genus of the pentagynia order belonging to the decandria claſs of plants; and in the natural method ranking under the 22d order, *Caryophylleæ*. The calyx is pentaphyllous; the petals are bifid; the capſule is unilocular, and opening at the top. There are 16 ſpecies, but none of them poſſeſſed of any remarkable property.

CERASUS, in botany. See PRUNUS.

(1.) * CERATE. *n. ſ.* [*cera*, Lat. wax.]. A medicine made of wax, which, with oil, or ſome ſofter ſubſtance, makes a conſiſtence ſofter than a plaſter. *Quincy.*

(2.) CERATE. See PHARMACY, *Index*.

* CERATED. *adj.* [*ceratus*, Lat.] Waxed; covered with wax.

CERATIO, the operation of waxing.

(1.) CERATION, or CERATIUM, in antiquity, a ſilver coin, equal to one third of an obolus.

(2.) CERATION, the name given by the ancients to the ſmall ſeeds of Ceratonia uſed by the Arabian phyſians as a weight to adjuſt the doſes of medicines; as the grain weight with us took its riſe from a grain of barley.

CERATOCARPUS, in botany: A genus of the monandria order, belonging to the monœcia claſs of plants; and in the natural method ranking under the 12th order, *Holeraceæ*. The male calyx is biparite; there is no corolla; the filament is long: The female calyx is diphyllous, and grown to the germen; there is no corolla; the ſtyles are two; the ſeed is two horned and compreſſed.

CERATOGLOSSUM, the ſame with the HYOGLOSSUS. See ANATOMY, § 201, and *Note* O.

CERATOMALGAMA, a cere-cloth, or cerate.

CERATONIA, the CAROB TREE, or *St John's bread*: A genus of the polygecia order, belonging to the polygamia claſs of plants; and in the natural method ranking under the 33d order, *Lomentaceæ*. The calyx is hermaphrodite and quinquepartite; there is no corolla; the ſtamina are 5; the ſtyle is filiform: the legumen coriaceous and polyſpermous. It is alſo diœcious, or male and female diſtinct on different plants. There is but one ſpecies, viz.

CERATONIA SILIQUA, a native of Spain, of ſome parts of Italy, and the Levant. It is an ever-green; and, in the countries where it is native, grows in the hedges. It produces a quantity of long, flat, brown coloured pods, which are thick, mealy, and of a ſweetiſh taſte. Theſe pods are eaten by the poorer ſort of inhabitants when there is a ſcarcity of other food: but they are apt to looſen the belly, and cauſe gripings of the bowels. They are called *St John's Bread*, from an aſſertion of ſome, that thoſe were the locuſts St John eat with his honey in the wilderneſs. The tree may be propagated in this country from ſeeds which muſt be ſown in a moderate hotbed, and the plants inured to the open air by degrees.

CERATOPHYLLUM, in botany: A genus of the polyandria order, belonging to the monœcia claſs of plants: and in the natural method ranking under the 15th order, *Inundatæ*. The male calyx is multipartite; no corolla; ſtamina from 16 to 20: The female calyx is multipartite; no corolla; one piſtil; no ſtyle; one naked ſeed.

CERATUS, a river in the iſland of Crete, 3 m. E. from th city of Candia.

CERAULA, in antiquity, one who played on the horn.

CERAUNIA, } or CERAUNIUS LAPIS, in na-
CERAUNIAS, } tural hiſtory, [from κεραυνος, a thunderbult,] a ſort of flinty ſtone, of no certain colour, but of a pyramidal or wedge like figure;

popularly ſuppoſed to fall from the clouds in the time of thunder-ſtorms, and to be poſſeſſed of divers notable virtues, as promoting ſleep, preſerving from lightning, &c. The ceraunia is the ſame with the thunder-ſtone, or arrow's head. Theſe are frequently confounded with the OMBRIÆ and BRONTIÆ, as being all ſuppoſed to have the ſame origin. Moſt naturaliſts take the ceraunia for a native ſtone, formed among the Pyrites, of a ſaline, concrete, mineral juice. Mercatus and Dr Woodward aſſert it to be artificial, and to have been thus faſhioned by tools. The ceraunia, according to theſe authors, are the heads of the ancient weapons of war, in uſe before the invention of iron: which, upon the introduction of that metal, growing into diſuſe, were diſperſed in the fields through different countries. Some of them had poſſibly ſerved in the early ages for axes, others for wedges, others for chiſſels; but the greater part for arrow-heads, darts, and lances. The ceraunia is alſo held by Pliny for a white or cryſtal-coloured gem, that attracted lightning to itſelf. What this was, is hard to ſay. Prudentius alſo ſpeaks of a yellow ceraunia; by which he is ſuppoſed to mean the carbuncle or pyropus.

CERAUNITES, the ſame with BELEMNITES.

CERAUNUS, [*κεραυνος, i. e.* the thunderer,] a title aſſumed by Seleucus III. king of Syria.

CERBERA, in botany: A genus of the monogynia order, belonging to the pentandria claſs of plants: and in the natural method ranking under the 30th order, *Contortæ*. The fruit is a monoſpermous plum. The moſt remarkable ſpecies is

CERBERA-ATROUAI, a native of the warm parts of America. It riſes with an irregular ſtem to 8 or 10 feet, ſending out many crooked diffuſed branches, which towards their tops are garniſhed with thick ſucculent leaves of a lucid green, ſmooth, and very full of a milky juice. The flowers come out in looſe bunches at the end of the branches; they are of a cream colour, having long narrow tubes, and at the top are cut into 5 obtuſe ſegments, which ſeem twiſted, ſo as to ſtand oblique to the tube. The wood of this tree ſtinks moſt abominably, and the kernels of the nuts are deadly poiſon, to which there is no antidote; ſo that the Indians will not even uſe the wood for fuel.

CERCERUS, in the mythology, a dreadful three-headed maſtiff, the ſon of Typhon and Echidna, and placed to guard the gates of hell. He fawned upon thoſe who entered, but devoured all who attempted to get back. He was, however, maſtered by Hercules, who dragged him up to the earth, when in ſtruggling, a foam dropped from his mouth, which produced the poiſonous herb called ACONITE, or *wolf's-bane.* Some have ſuppoſed that Cerberus is the ſymbol of the earth, or of all-devouring time: and that its three mouths repreſent, the preſent, paſt, and future. The victory obtained by Hercules over this monſter, denotes the conqueſt which this hero acquired over his paſſions. Dr Bryant ſuppoſes that Cerberus was the name of a place, and that it ſignified the temple of the Sun; deriving it from *Kir Abor the place of light.* This temple was alſo called *Tor Caph-El*, which was changed to τρικηφαλος; and hence Cerberus was ſuppoſed to have had three heads. It was likewiſe called *Tor Keren Turis Regia;* whence τρι καρηνος, from τρεις, *three*, and καρηνον, *head.*

(1.) CERBOLI, a mountain of Italy, 4 miles from Caſtel-Nuovo.

(2.) CERBOLI, a lake near the above mountain, which produces borax. See BORAX, § V.

CERCELE, in heraldry: a croſs cercele is a croſs which opening at the ends, turns round both ways like a rams's horn. See CROSS.

CERCHIALO, a mineral water of Lagune, in Italy, which produces borax. See BORAX, § V.

(1.) CERCIS, the JUDAS TREE: A genus of the monogynia order, belonging to the decandria claſs of plants; and in the natural method ranking under the 33d order, Lomentaceæ. The calyx is quinquedentated, and gibbous below; the corolla papilionaceous, with a ſhort vexillum or flag petal under the wings or ſide petals; a leguminous plant. There are only two ſpecies, both deciduous.

1. CERCIS CANADENSIS, or Canadian cercis, will grow to the ſize of the firſt ſort in ſome places. The branches are alſo irregualr. The leaves are cordated, downy, and alternate. The flowers are uſually of a paliſh red, and ſhow themſelves in ſpring, before the leaves are grown to their ſize. Theſe too are often eaten in ſallads, and afford an excellent pickle. There is a variety of this with deep red, and another with purple flowers. Theſe trees not only exhibit their flowers in cluſters, in different colours, early in ſpring, before the leaves are grown to ſuch a ſize as to hide them; but alſo afford a pleaſing variety from the difference of the upper and lower ſurface of the leaves, the one being of a fine green, the other of a hoary caſt, which the waving winds preſent alternately to view.

2. CERCIS SILIQUASTRUM, common Juda tree, or Italian cercis, a native of Italy and other parts of the ſouth of Europe.—Theſe trees differ in their growth in different places: In ſome they will arrive to near 20 feet high; whilſt in others they will not riſe to more than 10 or 12 feet, ſending forth young branches irregularly from the very bottom. The ſtem is of a dark greyiſh colour, and the branches, which are few and irregular, have a purpliſh caſt. The leaves are ſmooth, heart-ſhaped, and roundiſh, of a pleaſant green on their upper ſurface, hoary underneath, and grow alternately on long footſtalks. The flowers are of a fine purple: They come out early in ſpring, in cluſters, from the ſide of the branches growing upon ſhort footſtalks; and in ſome ſituations they are ſucceeded by long flat pods, containing the ſeeds, which in very favourable ſeaſons, ripen in England. Some are fond of eating theſe flowers in ſallads, on which account alone in ſome parts this tree is propagated. The varieties of this ſpecies are, 1. The *Fleſh-coloured*: 2. The *White flowered*; and, 3. The *Broad-podded Judas tree.*

(II.) CERCIS, CULTURE OF THE. Both theſe ſpecies muſt be propagated by ſeeds, which are had from abroad, and are generally brought ſound. They may be ſown in February or March, in common garden mould, well dug, and cleared of all roots, weeds, &c. wherein lines may be drawn for the beds. The mould being fine, part of it ſhould be taken out, and ſifted over the ſeeds, after they are ſown, about half an inch thick. Part of the ſeeds will come up in ſpring, the others will remain until the ſpring following. The bed therefore muſt not be deſtroyed, but the plants drawn carefully out; after which there will be a ſucceeding crop. The ſeeds being come up, muſt be weeded, and watered in the dry ſeaſon; and they will require no father care during the firſt ſummer. In winter they may be left to themſelves, for they are very hardy; though the ends of the branches will be killed by the froſt, nay, ſometimes to the very bottom of the young plant, but it will ſhoot out again afreſh in ſpring. To ſecure the ſeeding plants from this, the beds ſhould be hooped, in order to throw mats over them during the froſt. Toward the end of March, or beginning of April, the plants having been in the ſeed bed one or two years, they ſhould be taken out, and planted in the nurſery; one foot aſunder and two feet in the rows. The weeds ſhould be hoed down in ſummer. Digging between the rows in winter, is alſo proper. Here they may ſtand until they are to be removed finally; but they muſt be gone over in the winter with the knife, and irregular branches taken off near the root; by which the tree may be trained up to a ſtem. The wood is of great value: for it poliſhes well, and is admirably veined with black and green.

CERCOPITHECI, in natural hiſtory, the name given by Mr Ray, as well as by Dr Gmelin and Mr Kerr, to monkeys, or apes with long tails. See Ape, § 2, and Simia.

CERDA, John Lewis de la, a learned Jeſuit of Toledo, who wrote large commentaries on Virgil, which have been much eſteemed; alſo ſeveral other works. He died in 1643, aged 80.

CERDAGNA, a territory in the Pyrenees, partly belonging to France, and partly to Spain:—

1. Cerdagna, French, lies in the department of the Eaſtern Pyrenees. Mount Louis is the capital.

2. Cerdagna, Spanish, lies in Catalonia. Puycerda is the capital.

CERDO, the zerda. See Canis, N° I. § iv.

CERDON, a Syrian, who being accuſed of Manicheiſm, came to Rome in the time of pope Hyginus, and abjured his errors, about A. D. 56; but was afterwards convicted of perſiſting in them, and caſt out of the church. Cerdon aſſerted two principles, the one good and the other evil. This laſt, according to him, was the creator of the world, and the god that appeared under the old law. The firſt, whom he called *unknown*, was the father of Jeſus Chriſt; who, he taught, was incarnate only in appearance, and was not born of a virgin; nor did he ſuffer death but in appearance. He denied the reſurrection; and rejected all the books of the Old Teſtament, as coming from an evil principle. Marcion was his diſciple.

CERDONIANS, ancient heretics, who maintained moſt of the errors of Simon Magus, Saturninus, and the Manichees, ſo named from their leader Cerdon.

(1.) CERE, *n. ſ.* [*cera*, Lat.] wax.

(2.) Cere, St, or St Sere, a town of France, in the department of Lot, and ci-devant province of Querci, 32 miles NE. of Cahors. Lon. 1. 33. E. Lat. 44. 45. N.

* *To* Cere. *v. a.* [from *cera*, Lat. wax.] To wax.—You ought to pierce the ſkin with a needle, and ſtrong brown thread *cered*, about half an inch from the edges of the lips. *Wiſeman.*

(1.) CEREA, a diſtrict of the late Italian republic, in the dep. of Benaco, containing one town and five pariſhes.

(2.) Cerea, a well built town in the above diſtrict, ſituated on the Menago. Near this town Gen. Wurmſer defeated the French, in Sept. 1796.

CEREALIA ÆDILES. See Ædile.

(1.) CERELIAS, in antiquity, feaſts of Ceres, inſtituted by Triptolemus, ſon of Celeus king of Eleuſine, in gratitude for his having been inſtructed by Ceres, who was ſuppoſed to have been his nurſe, in the art of cultivating corn and making bread. There were two feaſts of this kind at Athens; the one called Eleusinia, the other Thesmophoria. Both agreed in this, that they were celebrated with a vaſt ſhow of religion and purity; ſo that it was eſteemed a great pollution to meddle, in thoſe days, in conjugal matters. On theſe occaſions Bacchus, as well as Ceres was honoured. The victims offered were hogs, on account of the waſte they make in the products of the earth. Whether wine was offered, is much diſputed among the critics. Plautus and Macrobius countenance the negative ſide; Cato and Virgil the poſitive. Macrobius ſays, indeed, they did not offer wine to Ceres, but *mulſum*, which was a compoſition of wine and honey boiled up together; that the ſacrifice made on the 21ſt Dec. to that goddeſs and Hercules, was a pregnant ſow, together with cakes and mulſum; and that this is what Virgil means by *Mili Baccho*. The *cerealia* paſſed from the Greeks to the Romans, who held them for 8 days ſucceſſively; commencing on the 5th of the ides of April. The women alone were concerned in the celebration, all dreſſed in white: the men, likewiſe in white, were only ſpectators. They ate nothing till after ſunſet; becauſe Ceres, in her ſearch after her daughter, took no repaſt but in the evening. This feſtival was omitted by the Romans, after the defeat at Cannæ, the mourning being ſo univerſal, that there were no women to celebrate it, out of mourning.

(2.) Cerealia, in botany, the name uſed by Linnæus for the larger eſculent ſeeds of the graſſes: viz. rice, wheat, rye, barley, oats, millet, panic graſs, Indian millet, holcus, zizania, and maize. To theſe may be added darnel, which, by preparation, is rendered eſculent.

* CEREBEL. *n. ſ.* [*cerebellum*, Lat.] Part of the brain —In the head of man, the baſe of the brain and *cerebel*, yea, of the whole ſkull, is ſet parallel to the horizon. *Derham.*

CEREBELLUM. See Anatomy, *Index*.

CEREBRUM, the brain. See Anatomy, *Index*. Dr Hunter obſerves, that the principal parts of the medullary ſubſtance of the brain in otedas and madmen, ſuch as the *thalani nervorum* *opticorum*, and *medulla oblongata*, are found entirely changed from a medullary to a hard, tough, dark coloured ſubſtance; ſometimes reſembling white leather.

* CERECLOTH. *n. ſ.* [from *cere* and *cloth*.] Cloth ſmeared over with glutinous matter, uſed to wounds and bruiſes.—The ancient Egyptian mummies were ſhrowded in a number of folds of linen, beſmeared with gums, in manner of *cerecloth. Bacon.*

CEREFOLIUM. See CHÆROPHYLLUM.

CERELÆUM, a compoſition of wax and oil.

* CEREMENT. *n. ſ.* [from *cera*, Lat. wax.] Cloths dipped in melted wax, with which dead bodies were infolded when they were embalmed.

Let me not burſt in ignorance, but tell,
Why thy canonized bones, hearſed in earth,
Have burſt their *cerements?* *Shak.*

(1.) * CEREMONIAL. *adj.* [from *ceremony*.] 1. Relating to ceremony, or outward rite; ritual.—Chriſt did take away that external *ceremonial* worſhip that was among the Jews. *Stillingfleet.* 2. Formal; obſervant of old forms.—

With dumb pride, and a ſet formal face,
He moves in the dull *ceremonial* track,
With Jove's embroider'd coat upon his back.
Dryden.

(2.) * CEREMONIAL. *n. ſ.* [from *ceremony*.] 1. Outward form; external rite; preſcriptive formality.—The only condition that could make it prudent for the clergy, to alter the *ceremonial*, or any indifferent part, would be a reſolution in the legiſlature to prevent new ſects. *Swift.* 2. The order for rites and forms in the Romiſh church.

(3.) CEREMONIAL, CEREMONIALE, § 2. *def.* 2. This book in the Roman church is called *ordo Romanus.* It was publiſhed in 1516, by the biſhop of Corcyra; at which the college of cardinals were ſo ſcandalized, that ſome of them voted to have the author as well as the book burnt, for expoſing the ſacred ceremonies to the eyes of profane people.

(4.) CEREMONIAL denotes alſo the manner in which princes and ambaſſadors uſe to receive and to treat one another. There are endleſs diſputes among ſovereigns about the *ceremonial:* ſome endeavouring to be on a level, and others to be ſuperior. Numerous ſchemes have been propoſed for ſettling them. The chief are, 1. To accommodate the difference by compromiſe or alternation, ſo that one ſhall precede now, the other the next time; or one in one place, and the other in another: 2. By ſeniority; ſo that an elder prince in years ſhall precede a younger, without any other diſtinction. Theſe expedients, however, have not yet been accepted of by any, except ſome *alternate princes*, as they are called, in Germany.

(5.) CEREMONIAL LAW, the regulations given by Moſes relating to the worſhip of God among the ancient Jews. In this ſenſe it is the ſame with the *Levitical law*, and ſtands diſtinguiſhed from the moral, as well as judicial law.

* CEREMONIALNESS. *n. ſ.* [from *ceremonial*.] The quality of being ceremonial; over-much uſe of ceremony.

(1.) CEREMONIES, ASSISTANT MASTER OF THE, an officer appointed to execute the office of MASTER, (See N° 2.) whenſoever he is abſent. His ſalary is 141*l.* 13*s.* and 4*d. per annum.*

(2.) CEREMONIES, MASTER OF THE, an officer inſtituted by king James I. for the reception of ambaſſadors and ſtrangers of quality. He wears about his neck a chain of gold, with a medal, having on one ſide an emblem of peace, with this motto, *Beati pacifici;* and on the other, an emblem of war, with *Dieu et mon droit.* His ſalary is 300*l. per annum.*

(3.) CEREMONIES, MARSHALL OF THE, is their officer, being ſubordinate to them both. His ſalary is 100*l. per annum.*

* CEREMONIOUS. *adj.* [from *ceremony*.] 1. Conſiſting of outward rites.—Under a different œconomy of religion, God was more tender of the ſhell and *ceremonious* part of his worſhip. *South.* 2. Full of ceremony; awful.—

O, the ſacrifice,
How *ceremonious*, ſolemn, and unearthly,
It was i' th' offering! *Shak.*

3. Attentive to outward rites, or preſcriptive formalities.—

You are too ſenſeleſs obſtinate, my lord;
Too *ceremonious*, and traditional. *Shak.*

4. Civil; according to the ſtrict rules of civility; formally reſpectful.—They have a ſet of *ceremonious* phraſes, that run through all ranks and degrees among them. *Addiſon's Guardian.* 5. Obſervant of the rules of civility.—

Then let us take a *ceremonious* leave,
And loving farewel of our ſeveral friends. *Shak.*

6. Civil and formal to a fault.—The old caitiff was grown ſo *ceremonious*, as he would needs accompany me ſome miles in my way. *Sidney.*

* CEREMONIOUSLY. *adv.* [from *ceremonious*.] In a ceremonious manner; formally; reſpectfully.—

Ceremoniouſly let us prepare
Some welcome for the miſtreſs of the houſe.
Shakeſpeare.

* CEREMONIOUSNESS. *n. ſ.* [from *ceremonious*.] Fondneſs of ceremony; the uſe of too much ceremony.

(1.) * CEREMONY. *n. ſ.* [*ceremonia*, Lat.] 1. Outward rite; external form in religion.—

Bring her up to the high altar, that ſhe may
The ſacred *ceremonies* partake. *Spenſer.*

2. Forms of civility.—

The ſauce to meat is *ceremony;*
Meeting were bare without it. *Shak.*

3. Outward forms of ſtate.—

What art thou, thou idle *ceremony?*
What kind of god art thou, that ſuffer'ſt more
Of mortal grief, than do thy worſhippers?
Art thou aught elſe but place, degree, and form?
Shak.

A coarſer place,
Where pomp and *ceremonies* enter'd not,
Where greatneſs was ſhut out, and highneſs
well forgot. *Dryden's Fables.*

(2.) CEREMONY, (§ 1. *def.* 3.) an aſſemblage of ſeveral actions, forms, and circumſtances, ſerving to render a thing magnificent and ſolemn. See CEREMONIES, § 2. In 1646, M. Ponce publiſhed a hiſtory of ancient ceremonies, tracing the riſe, growth, and introduction of each riſe into the church, and its gradual advancement to ſuperſtition. Many of them were borrowed from Judaiſm; but more from Paganiſm. Dr Middleton has given a fine diſcourſe on the conformity between the pagan and popiſh ceremonies, which he exemplifies in the uſe of incenſe, holy water, lamps and candles, before the ſhrines of ſaints; votive gifts round the ſhrines of the deceaſed, &c. In fact, the altars, images, croſſes, proceſſions, miracles, and legends; nay, even the very hierarchy, pontificate, religious orders, &c. of the preſent Romans, he ſhows, are all copied from their heathen anceſtors.—An ample and magnificent repreſentation in figures of the religious ceremonies and cuſtoms of all nations in the world, deſigned by Picart, is added, with hiſtorical explanations, and many curious diſſertations.

CERENZA, a town of Naples, in the Hither Calabria, with a biſhop's ſee, ſeated on a rock, 12 miles NW. of St Severina. Lon. 17. 5. E. Lat. 39. 23. N.

(1.) CERES, a pariſh in Fifeſhire, 8 miles long, and from half a mile to 4 miles broad; containing about 8000 acres. The climate and ſoil are various, the ſurface being hilly; though the hills are almoſt all cultivated to the top. Agriculture is much improved within theſe 30 years, and the produce is increaſed ten-fold. It is eſtimated at 12,000 bolls, annually, of all kinds of grain: beſides 2000 bolls of potatoes, and 1500 ſtones of flax; although 6 tenths of the ground are commonly under graſs. Farms are let at from 40 to 400 acres. The population in 1801, was 2352. In this pariſh Mr Lunardi alighted from his firſt aerial voyage, after paſſing over about 32 miles of land and water. See AEROSTATION, *Index*.

(2.) CERES, a village in the above pariſh, which, in 1772, contained 740 inhabitants; and had 138 looms employed in the linen manufacture. It has fairs, June 24, and Oct. 20.

(3.) CERES, in the heathen mythology, the goddeſs of corn. She was the daughter of Saturn and Ops, and the mother of Proſerpine, by Jupiter. Pluto having ſtolen away Proſerpine, Ceres travalled all over the world in queſt of her, by the help of a torch, which ſhe had lighted in Mount Ætna. In this ſearch, ſhe came to Celeus king of Eleuſis, and undertook to bring up his infant ſon Triptolemus. To render her charge immortal, ſhe fed him with divine milk, and in the night covered him with fire. Celeus obſerving an unuſual improvement in his ſon, reſolved to watch his nurſe, to which end he hid himſelf in that part of the houſe where ſhe uſed to cover the child with fire; but when he ſaw her put the infant under the embers, he cried out and diſcovered himſelf. Ceres puniſhed his curioſity with death. Afterwards ſhe taught the youth agriculture, and mounted him in a chariot drawn by winged dragons, that he might traverſe the world, and teach mankind the uſe of corn and fruits. Having at laſt diſcovered, by the nymph Arethuſa, that Proſerpine was in the infernal regions, ſhe applied to Jupiter, and obtained of him that her daughter ſhould be reſtored, provided ſhe had taſted nothing during her ſtay; but Aſcalaphus declaring that, while walking in Pluto's orchard, ſhe had pulled an apple, and had taſted of the ſeeds, ſhe was for ever forbidden to return. Ceres, out of revenge, turned Aſcalaphus into an owl. At length, Jupiter, to mitigate her grief, permitted Proſerpine to paſs one half of the year in the infernal regions with Pluto, and the other half with her mother on earth. Cicero mentions a temple of Ceres at Catanea in Sicily, where was a very ancient ſtatue of that goddeſs, but entirely concealed from the ſight of men, every thing being performed by matrons and virgins.

(4.) CERES and PALLAS, two planets which have lately been diſcovered; the former, on the 1ſt January 1801, by M. Piazzie, aſtronomer-royal at Palermo, and the latter by Dr Olbers of Hamburgh. Ceres, more diſtant from the Sun than Mars, and nearer than Jupiter, (its mean diſtance being above 250,000,000 Engliſh miles,) is ſo ſmall that glaſſes of a very high magnifying power will not ſhow it with a diſtinctly defined diameter, which is only 160 Engliſh miles; and revolves round the ſun in 4 years 222 days. Pallas, nearer than Jupiter, is near 270,000,000 Engliſh miles diſtant from the ſun, and its diameter is only 110 miles, ſo that it is more imperceptible than Ceres, both owing to its inferior ſize, and ſuperior diſtance from the earth, when both are in oppoſition to the ſun. The diſcovery of theſe two alters the former number of planets from 7 to 9.

(5.) CERES BURN, a rivulet in the above pariſh, (N° 1.) which after running through Kemback pariſh, falls into the Eden, below Dairſie-bridge.

CERET, a town of France, in the department of the Eaſtern Pyrenees, and ci-devant province of Rouſſillon, with a magnificent bridge of a ſingle arch, over the river Tet. In 1660, the commiſſioners of France and Spain met in this town to ſettle the limits of the two kingdoms. It is 12 m. from Perpignan. Lon. 2. 46. E. Lat. 42. 23. N.

CERETICA, the ancient name of Cardiganſh.

CEREUS, in botany. See CACTUS.

(1.) CERIGO, an iſland in the Archipelago, anciently called CYTHEREA; lying S. of the Morea, and N. of Candia. The country is mountainous, and the ſoil dry. It abounds with hares, quails, turtle, and falcons. It is 45 miles in circumference, and had formerly good towns; but there is now only one remaining. See N° 2.

(2.) CERIGO, the only town in the above iſland, is ſtrong both by art and nature, being ſeated on a craggy rock. The inhabitants are Chriſtian Greeks. Lon. 23. 22. E. Lat. 36. 20. N.

CERILLA, in the Spaniſh and French languages, denotes a ſort of ſmall c, to the bottom of which is affixed a kind of virgula, as ç, to denote that it is to be pronounced like s. The *cerilla* is called by ſome of our printers CECERIL. It is uſed before the vowels, a, o, and u; as in braços, choça, commença, leçon, deça, çamarra, çurzar, ça ira, &c.

CERIMISSI, or CEREMISSI, a territory of Ruſſia in Little Novogorod, ſeated on the Wolga.

CERINES, a town of Cyprus, with a good caſtle, a harbour and a biſhop's ſee. Lon. 33. 35. E. Lat 35. 59. N.

CERINTHE, HONEYWORT: A genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 41ſt order, *Aſperifoliæ*. The limb of the corolla is a ventricoſe tube with the throat pervious; and there are two bilocular ſeeds. There are 3 ſpecies, natives of Germany, Italy, and the Alps. They are low annual plants with purple, yellow, and red flowers, which may be propagated by ſeed ſown in autumn, in a warm ſituation.

CERINTHIANS, ancient heretics, who denied the deity of Jeſus Chriſt; ſo named from Cerinthus. They believed that he was a mere man, the ſon of Joſeph and Mary; but that, in his baptiſm, a celeſtial virtue deſcended on him in form of a dove; by means whereof he was conſecrated by the holy ſpirit; made Chriſt; and wrought ſo many miracles: That, as he received it from heaven, it quitted him after his paſſion, and returned to the place whence it came; ſo that Jeſus, whom they called a *pure man*, really died and roſe again; but that Chriſt, who was diſtinguiſhed from Jeſus, did not ſuffer at all. It was partly to refute this ſect, that St John wrote his goſpel. They received the goſpel of St Matthew, to countenance their doctrine of circumciſion, from Chriſt's being circumciſed; but they omitted the genealogy. They diſcarded the epiſtles of St Paul, becauſe that apoſtle held circumciſion aboliſhed.

CERINTHUS, one of the firſt hereſiarchs, being cotemporary with the apoſtles. Beſides the above tenets (ſee Cerinthians,) he aſcribed the creation not to God, but to angels; and taught that circumciſion ought to be retained under the goſpel. He is looked upon as the head of the converted Jews, who raiſed, in the church of Antioch, the diſſenſion mentioned in Acts xv. He publiſhed a work under the title of *Apocalypſe*, whence ſome pretend that he was the author of St John's Revelation. See Apocalypse, § 2.

CERISON, a river of the late Maritime diviſion of Auſtria, in the Vicentino, which runs into the Bichiglione.

CERITES, the ſame with Cerachates.

(1.) CERNE, an ancient iſland in the Ethiopian ſea, now called Madagascar.

(2.) Cerne, a river in Dorſetſhire.

(3.) Cerne Abbey, a town ſeated on the river, (N° 2.) in a pleaſant vale ſurrounded with ſteep hills, eſpecially on the N. (See Trendle hill.) It was built by St Auſtin, and has 3 fairs, with a market on Wedneſ. and lies 2 miles from Great Minden, 6 N. of Dorcheſter, and 123 from London.

(4.) Cerne, nether, } two villages on oppo-
(5.) Cerne, upper, } ſite ſides of Cerne Abbey.

CERNETZ, a town of Switzerland, in the Griſons, with a mineral ſpring, 24 miles SE. of Coire.

CERNEY, north, } two villages in Glouceſ-
Cerney, south, } terſhire, near the Downs, where Cirenceſter races are run; about 4 miles from Cricklade.

CEROCHYTOS, [from κηρος, wax, and χυω, to melt,] in antiquity, a method of painting in wax, melted and coloured with pigments for the purpoſe, and applied with pencils. See Caylus.

CEROFERARII, the ſame with Accedentes.

CEROMA, in antiquity; 1. a mixture of oil and wax with which the ancient wreſtlers rubbed themſelves, not only to make their limbs more ſleek, and leſs capable of being laid hold of, but more pliable, and fit for exerciſe. 2. A cerate, or cerecloth.

CEROMANTIA, an ancient method of divination, by means of wax melted over a veſſel of water, and let drop in three diſtinct ſpaces; obſerving the figure, ſituation, diſtance, and concretion of the drops.

CERONTES, an ancient people of Caledonia, who inhabited Roſs and Sutherland.

CEROPEGIA, in botany: A genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 30th order, *Contortæ*. There are two erect follicles; the ſeeds plumoſe or covered with a feathered pappus; the limb of the corolla connivent or cloſing at top.

* CEROTE. *n. ſ.* The ſame with *cerate;* which ſee.—In thoſe which are critical, a *cerote* of oil of olives, with white wax, hath hitherto ſerved my purpoſe. *Wiſeman.*

CEROTUS, the Roman name of Chertsey.

CERRIOY Druidon, a town of N. Wales in Denbighſhire, 8 miles from Ruthin, and Denbigh. It has fairs April 27, Aug. 27, Oct. 20, and Dec. 7.

CERRITO, a town of Naples, in Terra di Lavora, the reſidence of the biſhop of Teleſa. It has a cathedral and collegiate church, and is 5 miles NNE. of Teleſa.

* CERTAIN. *adj.* [*certus*, Lat.] 1. Sure; indubitable; unqueſtionable; undoubted; that which cannot be queſtioned, or denied.—Thoſe things are *certain* among men, which cannot be denied, without obſtinacy and folly. *Tillotſon.* 2. Reſolved; determined.—

However I with thee have fix'd my lot,
Certain to undergo like doom of death,
Conſort with thee. *Milton's Par. Loſt.*

3. Undoubting; put paſt doubt.—

This form before Alcyone preſent,
To make her *certain* of the ſad event. *Dryden.*

4. Unfailing; which always produces the expected effect.—I have often wiſhed that I knew as *certain* a remedy for any other diſtemper. *Mead.* 5. Conſtant; never failing to be.—

Virtue that directs our ways,
Thro' *certain* dangers to uncertain praiſe. *Dryd.*

6. Regular; ſettled; ſtated.—The preparation for your ſupper ſhews your *certain* hours. *Cotton.* 7. In an indefinite ſenſe, ſome; as, a *certain* man told me this.—How bad ſoever this faſhion may juſtly be accounted, *certain* of the ſame countrymen do paſs far beyond it. *Carew.*—

Some *certain* of your brethren roar'd and ran
From noiſe of our own drums. *Shak.*

* CERTAINLY. *adj.* [from *certain.*] 1. Indubitably; without queſtion; without doubt.—*Certainly* he that, by thoſe legal means, cannot be ſecured, can be much leſs ſo by any private attempt. *Decay of Piety.* 2. Without fail.

* CERTAINNESS. *n. ſ.* [from *certain.*] The ſame with *certainty.*

(1.) * CERTAINTY. *n. ſ.* [from *certain.*] 1. Exemption from doubt.—*Certainty* is the perception of the agreement or diſagreement of our ideas. *Locke.* 2. Exemption from failure: as, the *certainty* of an event, or of a remedy. 3. That which is real and fixed.—

Doubting things go ill, often hurts more,
Than to be ſure they do; for *certainties*
Or are paſt remedies, or timely knowing,
The remedy then born. *Shak.*

4. Regularity; ſettled ſtate.

(2.) CERTAINTY. See CERTITUDE, § II.

* CERTES. *adv.* [*certes*, Fr.] Certainly; in truth; in ſooth: an old word.—

Certes, our authors are to blame. *Hudibras.*

CERTHIA, in ornithology, the CREEPER or OX-EYE, a genus belonging to the order of picæ. The beak is arched, ſlender, ſharp, and triangular; the tongue is ſharp at the point; and the feet are of the walking kind, *i. e.* having the toes open and unconnected. Of this genus near 50 ſpecies have been enumerated by ornithologiſts; but Mr Latham ſuppoſes that many now deſcribed as ſpecies, will be found hereafter to be mere varieties; which, he adds, is no wonder, ſince many creepers do not gain their full plumage till the 3d year's moult. The following are a few of the moſt remarkable:

1. CERTHIA CARDINALIS, the *cardinal creeper*, has the head, neck, and breaſt, of a crimſon colour; down the middle of the back is a ſtripe of the ſame colour to the rump: the reſt of the body is black; and the wings and tail are black. It inhabits the cultivated parts of the iſland of Tanna; is there called KUYAMETA, and lives by ſucking the nectar of flowers. See *Plate* L. *fig.* 4.

2. CERTHIA COERULEA, the *blue creeper*, has the head of a moſt elegant blue; but on each ſide there is a ſtripe of black like velvet in which the eye is placed: the chin and throat are marked with black in the ſame manner; the reſt of the body violet blue. It inhabits Cayenne. Seba ſays, that it makes its neſt with great art. The outſide is compoſed of dry ſtalks of graſs, or ſuch like; but within of very downy ſoft materials, in the ſhape of a retort, which it ſuſpends from ſome weak twig, at the end of a branch of a tree; the opening or mouth downwards, facing the ground: the neck is a foot in length, but the real neſt is quite at the top, ſo that the bird has to climb up this funnel-like opening to get at the neſt. Thus it is ſecure from every harm; neither monkey, ſnake, nor lizard, daring to venture at the end of the branch, as it would not ſupport them.

3. CERTHIA FAMILIARIS, the common *ox-eye*, is grey above, and white underneath, with brown wings and 10 white ſpots on the 10 prime feathers. This bird is found in moſt parts of Europe, though it is believed no where ſo common as in Britain. The facility with which it runs on the bark of a tree, in all directions, is wonderful: This it does with as much eaſe as a fly on a glaſs window. It lives principally, if not wholly, on inſects, which it finds in the chinks and among the moſs of trees. It builds its neſt in ſome hole of a tree, and lays generally four eggs, very rarely more than 7: theſe are aſh-coloured, marked at the end with ſpots and ſtreaks of a deeper colour; and the ſhell is pretty hard. It remains in the places which it frequents during the winter, and builds its neſt early in the ſpring.

4. CERTHIA LOTENI, *Loten's creeper*, has the head, neck, back, rump, ſcapulars, and upper tail-coverts, of green gold; beneath, from the breaſt to the vent, of velvet black, which is ſeparated from the green on the neck by a tranſverſe bright violet band, a line and a half in breadth: the leſſer wing coverts are of this laſt colour; the middle coverts are green gold; and the greater coverts are very fine black, edged with green gold on the outer edge: the quills are of the ſame colour, as are alſo the tail feathers. The female differs in having the breaſt, belly, ſides, thighs, under wing and tail coverts of a dirty white, ſpotted with black; and the wings and tail not of ſo fine a black. It inhabits Ceylon, and Madagaſcar; and is called *Angaladian*. Buffon ſays it makes its neſt of the down of plants, in form of a cup, like that of a chaffinch, the female laying generally 5 or 6 eggs; and that it is ſometimes chaſed by a ſpider as large as itſelf, and very voracious, which ſeizes on the whole brood, and ſucks the blood of the young birds.

5. CERTHIA PUSILLA, or the brown and white creeper, according to Edwards, is not above half the ſize of our European creeper. The upper part of the body is brown, with a changeable gloſs of copper: the under parts are white; the quills brown, edged with gloſſy copper; the tail blackiſh, the outer feather tipped with white. The bird from which Edwards drew his figure had a label tied to it, by the name of Honeythief. Thoſe who keep birds at the Cape of Good Hope, having many ſorts in large cages, ſupply them with only honey and water. They alſo catch flies, which come within the reach of their confinement; and thoſe make up their whole ſubſiſtence. It has been attempted to tranſport them further, but the want of flies on board a ſhip prevented them living more than 3 weeks; ſo neceſſary are inſects to their ſubſiſtence.

6. CERTHIA RUBRA, or the *hook-billed red creeper*, has the bill ſomewhat leſs hooked than the laſt ſpecies; the general colour of plumage is ſcarlet; wings and tail black. See *Plate* L. *fig.* 5. In ſome the forehead is of a buff-colour; and the parts about the head and neck have both a mixture of buff and duſky black, which are ſuſpected to be the birds not yet arrived at their full plumage.

7. CERTHIA SIMULANS, the *mocking creeper*, or *mocking bird*, is of the ſize of the leſſer thruſh. On the cheeks is a narrow white ſpot: the head, eſpecially on the crown, is inclined to violet: the plumage in general is olive green, inclining to yellow on the under parts: the quills are brown; the ſecondaries edged with olive; the colour of the tail is like that of the ſecondaries, and ſomewhat forked; the legs are duſky blue, and the claws black. It inhabits both the iſlands of New Zealand. It has an agreeable note in general; but at times ſo varies and modulates the voice, that it ſeems to imitate the notes of all other birds; hence the name. Being fond of thruſting its head into flowers, which have a purpliſh coloured farina, much of it adheres to the feathers about the head and bill, and in courſe gives the appearance above mentioned; but this in time rubs off, and the colour of the head appears the ſame with the reſt of the plumage.

8. CERTHIA VIRIDIS, the *hook-billed green creeper*, has a bill 1¼ inches long, and bent in a ſemicircle. The plumage in general is olive green, paleſt be-

neath, and ſomewhat inclined to yellow: the quills and tail are duſky; the legs duſky brown; and the feathers juſt above the knee, or garter, white. It inhabits the Sandwich Iſlands in general, and is one of the birds whoſe plumage the natives make uſe of in conſtructing their feathered garments; which, having theſe olive-green feathers intermixed with the beautiful ſcarlet and yellow ones belonging to the next ſpecies, and yellow-tufted Bee-eater, (ſee Merops,) make ſome of the moſt beautiful coverings of theſe iſlanders.

(1.) * **CERTIFICATE.** *n. ſ.* [*certificat*, low Lat. he certifies.] 1. A writing made in any court, to give notice to another court of any thing done therein. *Cowel.* 2. Any teſtimony.—A *certificate* of poverty is as good as a protection. *L'Eſtrange.* —I can bring *certificates*, that I behave myſelf ſoberly before company. *Addiſon.*

(2.) **Certificate, trial by**, in the Engliſh law, a ſpecies of trial allowed in ſuch caſes, where the evidence of the perſon certifying is the only proper criterion of the point in diſpute. See Trial. For when the fact in queſtion lies out of the cognizance of the court, the judges muſt rely on the ſolemn averment of perſons in ſuch a ſtation as affords them the moſt clear and competent knowledge of the truth. As therefore ſuch evidence, if given to a jury, muſt have been concluſive, the law, to ſave trouble and circuity, permits the fact to be determined upon ſuch certificate merely. Thus, 1. If the iſſue be whether A was abſent with the king in his army out of the realm in time of war, this ſhall be tried by the certificate of the mareſchal of the king's hoſt in writing under his ſeal, which ſhall be ſent to the juſtices. 2. If, in order to avoid an outlawry, or the like, it was alledged that the defendant was in priſon, *ultra mare*, at Bourdeaux, or in the ſervice of the mayor of Bourdeaux, this ſhould have been by the certificate of the mayor; and the like of the captain of Calais. But when this was law, thoſe towns were under the dominion of the crown of England. And therefore, by a parity of reaſon, it ſhould now hold, that in ſimilar caſes ariſing at Jamaica or Minorca, the trial ſhould be by certificate from the governor of thoſe iſlands. We alſo find that the certificate of the queen's meſſenger, ſent to ſummon home a peereſs of the realm, was formerly held a ſufficient trial of the contempt in refuſing to obey ſuch ſummons. 3. For matters within the realm; the cuſtoms of the city of London ſhall be tried by the certificate of the mayor and aldermen, certified by the mouth of their recorder; upon a ſurmiſe from the party alledging it, that the cuſtom ought to be thus tried: elſe it muſt be tried by the country. As, the cuſtom of diſtributing the effects of freemen deceaſed; of enrolling apprentices; or that he who is free of one trade may uſe another; if any of theſe, or other ſimilar points come in iſſue. 4. The trial of all cuſtoms and practice of the courts ſhall be by certificate from the proper officers of thoſe courts reſpectively and what return was made on a writ by the ſheriff or under-ſheriff, ſhall be only tried by his own certificate.

CERTIFICATION, *n. ſ.* The art of certifying.

* *To* **CERTIFY.** *v. a.* [*certifier*, Fr.] 1. To give certain information of.—The Engliſh embaſſadours returned out of Flanders from Maximilian, and *certified* the king, that he was not to hope for any aid from him. *Bacon.*—This is deſigned to *certify* thoſe things that are confirmed of God's favour. *Hammond's Fundamentals.* 2. It has *of* before the thing told, after the perſon told: as, I *certified* you *of* the fact.

(1.) * **CERTIORARI.** *n. ſ.* [Lat.] A writ iſſuing out of the chancery, to call up the records of a cauſe therein depending, that juſtice may be done; upon complaint made by bill, that the party, who ſeeks the ſaid writ, hath received hard dealing, in the ſaid court. *Cowel.*

(2.) **Certiorari** is made returnable either in the king's bench, common pleas, or in chancery. It is not only iſſued out of the court of chancery, but likewiſe out of the king's bench, in which laſt mentioned court it lies where the king would be certified of a record. Indictments from inferior courts, and proceeding of the quarter ſeſſions of the peace, may alſo be removed into the king's bench by a certiorari: and here the very record muſt be returned, and not a tranſcript of it; though uſually in chancery, if a certiorari be returnable there, it removes only the tenor of the record.

(I.) * **CERTITUDE.** *n. ſ.* [*certitudo*, Lat.] Certainty; freedom from doubt; infallibility of proof.

They thought at firſt they dream'd; for 'twas offence
With them, to queſtion *certitude* of ſenſe. *Dryd.*

(II.) **Certitude** conſidered in the things or ideas which are the objects of our underſtanding, is a neceſſary agreement or diſagreement of one part of our knowledge with another: as applied to the mind, it is the perception of ſuch agreement or diſagreement; or ſuch a firm well-grounded aſſent, as excludes not only all manner of doubt, but all conceivable poſſibility of a miſtake. There are 3 ſorts of certitude, or aſſurance, according to the different natures and circumſtances of things: viz.

1. **Certitude, mathematical**, is that ariſing from mathematical evidence: ſuch as, that the 3 angles of a triangle are equal to two right angles.

2. **Certitude, moral**, is that founded on moral evidence, and is frequently equivalent to a mathematical one; as that there was formerly ſuch an emperor as Julius Cæſar, and that he wrote the commentaries which paſs under his name; becauſe the hiſtorians of theſe times have recorded it, and no man has ever diſproved it ſince: this affords a moral certitude, in common ſenſe ſo great, and one would be thought a madman who ſhould deny it.

3. **Certitude, natural**, or } that which de-
3. **Certitude, physical**, } pends upon the
evidence of ſenſe; as that I ſee ſuch or ſuch a colour, or hear ſuch or ſuch a ſound; no body queſtions the truth of this, where the organs, the medium, and the object are rightly diſpoſed.

CERTOSA, a village of the late Italian republic, in the dep. of the Teſſino, and ci-devant principality of Pavia, famous for its Carthuſian convent, in the middle of a great park, the ſquare wall of which is 20 miles in circumference, and reaches nearly to Pavia. Here Francis I. king of France was taken priſoner by the Auſtrians, on the 20th Feb. 1525.

CERVANTES Saavedra, Michael de, the inimitable author of Don Quixote, was born at Madrid in 1549. From his infancy he was fond of books; but he applied himſelf wholly to novels and poetry, eſpecially thoſe of Spaniſh and Italian authors. He went to Italy, to ſerve Cardinal Aquaviva, to whom he was chamberlain at Rome; and afterwards followed the profeſſion of a ſoldier, for ſome years, under the victorius Colonna. He was preſent at the battle of Lepanto, in 1571; in which he loſt his left hand by a ſhot. After this he was taken by the Moors, and carried to Algiers, where he continued a captive 5½ years. Then he returned to Spain, and wrote ſeveral comedies and tragedies; which were well received, and acted with great applauſe. In 1584 he publiſhed his *Galatea*, a novel in 6 books. But the work which has immortalized his name, is the *Hiſtory of Don Quixote;* the firſt part of which was printed at Madrid in 1605. This is a ſatire upon books of knight errantry; and the chief end of it was to deſtroy the reputation of theſe books. It was univerſally read; and the moſt eminent painters, tapeſtry-workers, engravers, and ſculptors, were ſoon employed in repreſenting the hiſtory of Don Quixote. Cervantes's work, even in his liftime, had the honour of receiving royal approbation. As Philip III. was ſtanding in a balcony of his palace at Madrid, he obſerved a ſtudent on the banks of the Manzanares reading a book, and from time to time breaking off and beating his forehead, with extraordinary marks of delight: upon which the king ſaid, "That ſcholar is either mad, or reading Don Quixote:" the latter of which proved to be the caſe. But notwithſtanding the vaſt applauſe his book every where met with, Cervantes had much ado to keep himſelf from ſtarving. In 1615, he publiſhed a 2d part. He wrote alſo ſeveral novels; and among the reſt, *The Troubles of Perſiles and Sigiſmunda.* He had employed many years in writing this novel, and finiſhed it but juſt before his death; for he did not live to ſee it publiſhed. His ſickneſs was of ſuch a nature, that he was able to be his own hiſtorian. At the end of the preface to this work, he repreſents himſelf on horſeback upon the road, and a ſtudent, who had overtaken him, engaged in converſation with him: "And happening to talk of my illneſs, (ſays he,) the ſtudent ſoon let me know my doom, by ſaying it was a dropſy I had got; the thirſt attending which, all the water of the ocean, though it were not ſalt, would not ſuffice to quench. Therefore Senor Cervantes, ſays he, you muſt drink nothing at all, but do not forget to eat; for this alone will recover you without any other phyſic. I have been told the ſame by others, anſwered I; but I can no more forbear tippling, than if I were born to do nothing elſe. My life is drawing to an end; and from the daily journal of my pulſe, I ſhall have finiſhed my courſe by next Sunday at the fartheſt.—But adieu, my merry friends all, for I am going to die; and I hope to ſee you ere long in the other world, as happy as heart can wiſh." His dropſy increaſed, and at laſt proved fatal to him; yet he continued to ſay and to write *bon mots.* He received the laſt ſacrament on the 18th April 1616; yet the day after wrote a Dedication of his book to the Count de Lemos.

(1.) CERVERA, a river of Spain, in Catalonia.

(2.) Cervera, a town ſeated on the above river, 22 miles W. of Tarragona. Lon. 1. 9. E. Lat. 41. 25 N.

CERVETERI, anciently Cæra, a ſmall town of Italy, in the late territory of the Pope.

CERVIA, anciently Ficulus, a ſea port town of Italy, in Romagna, ſeated on the gulph of Venice; 10 miles SE. of Ravenna. It was lately rebuilt and the ſtreets are broad. Lon. 12. 17. E. Lat. 44. 30. N.

(1.) * CERVICAL. *adj.* [*cervicalis*, Lat.] Belonging to the neck.—The aorta bending a little upwards, ſends forth the *cervical* and axillary arteries; the reſt turning down again, forms the deſcending trunk. *Cheyne.*

(2.) Cervical arteries. See Anatomy, *Ind.*

(3.) Cervical nerves, ſeven pair of nerves, ſo called, as having their origin in the Cervix. See Anatomy, *Index.*

(4.) Cervical sinuses. } See Anatomy, *In-*
(5.) Cervical veins. } *dex.*

CERVICAPRA. See Capra, N° I & V.

CERVICARIA, in botany. See Campanula.

CERVISPINA. See Rhamnus.

(1.) CERVIX, in anatomy, properly denotes the hind part of the neck; as diſtinguiſhed from the fore part, called *jugulum,* or the throat. See Anatomy, § 209.

(2.) Cervix scapulæ, the head of the ſhoulder-blade, or that upper proceſs whoſe *ſinus* receives the head of the *humerus.*

(3.) Cervix uteri, the neck of the *uterus;* called alſo Vagina. See Anatomy, *Index.*

* CERULEAN. } *adj.* [*cæruleus*, Lat.] Blue;
* CERULEOUS. } ſky-coloured.—It afforded a ſolution, with, now and then, a light touch of ſky colour, but nothing near ſo high as the *ceruleous* tincture of ſilver. *Boyle.*—

From thee ſaphire ſolid either takes
Its hue *cerulean.* *Thomſon's Summer.*

* CERULIFICK. *adj.* [from *ceruleous.*] Having the power to produce a blue colour.—The ſeveral ſpecies of rays, as the rubifick, *cerulifick,* and others are ſeparated one from another. *Grew.*

(1.) * CERUMEN. *n. ſ.* [Lat.] The wax or excrement of the ear.

(2.) Cerumen. See Anatomy, § 550.

CERURA, in old recods, a mound, a fence.

(1.) * CERUSE. *n. ſ.* [*ceruſſa*, Lat.] White lead.—A preparation of lead with vinegar, which is of a white colour; whence many other things, reſembling it in that particular, are by chymiſts called *ceruſe*, as the *ceruſe* of antimony, and the like. *Quincy.*

(2.) Ceruse of antimony. See Antimony, § 7. and Chemistry, *Index.*

(3.) Ceruse, or } See Chemistry, *Ind.* Ceruſe,
CERUSS. } as a medicine, is uſed externally, either mixed in ointments, or by ſprinkling it on old gletting and watery ulcers, and in many diſeaſes of the ſkin. If, when it is reduced into a fine powder, it is received in with the breath in inſpiration, and carried down into the lungs, it cauſes an incurable aſthma. Inſtances of the very pernicious

CERVUS.

Roe Buck

Male.

Female.

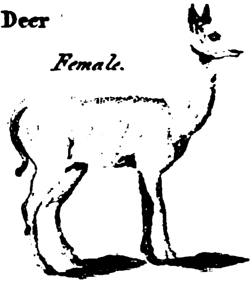
The Stag.

Rein Deer.

Fallow Deer

Male.

Female.



Axis.

Hog Stag.

The Elk.

Mooſe Deer.

pernicious effects of this metal are too often ſeen among thoſe perſons who work lead in any form, but particularly among the workers in white lead. Painters uſe it in great quantities; and that it may be afforded cheap to them, it is generally adulterated with common whiting.

(I.) CERVUS, the DEER, in zoology, a genus of quadrupeds belonging to the order of Pecora. See *Plate* LXIV. The horns are ſolid, branched, brittle, covered with a hairy, or rather *velvet* ſkin, (which falls off at full growth,) and growing from the top; they likewiſe fall off and are renewed annually. There are eight fore teeth in the under jaw, but no dog-teeth. Theſe animals all live in woods, and are ſaid to have no gall-bladder. The ſpecies enumerated by Linnæus are 7; but Mr Kerr, beſides the CAMELOPARDALIS, (ſee N° iii.) and the GUINEENSIS, (N° vii.) with 13 non-deſcripts, (which he mentions of uncertain ſpecies,) deſcribes 11 diſtinct ſpecies, with their varieties: viz.

i. 1. CERVUS ALCES, the ELK, or MOOSE DEER, the *alce* or *machlis* of Pliny, has broad palmated horns, very ſhort beams or none, and a fleſhy protuberance on the throat. The neck is much ſhorter than the head, with a ſhort, thick, upright mane, of a light brown colour. The eyes are ſmall; the ears a foot long, very broad and ſlouching; noſtrils very large; the upper lip ſquare, hangs greatly over the lower, and has a deep ſulcus in the middle, ſo as to appear almoſt bifid. This is the bulkieſt animal of the deer kind, being ſometimes 17 hands high, and weighing above 1200 pounds. The female is leſs than the male, and wants horns. The elks inhabit Europe, America, and Aſia, as far as Japan; chiefly frequenting the cold and woody regions. They are found in all the woody tracts of the temperate parts of Ruſſia, but not on the Arctic flats, nor in Kamtſchatka. In Siberia they are of a monſtrous ſize, particularly among the mountains. The elk and the *mooſe*, according to Mr Pennant, are the ſame ſpecies; the laſt derived from *muſu*, the Algonkin name for that animal. Theſe animals reſide amidſt foreſts, for the conveniency of browſing the boughs of trees, being prevented from grazing with eaſe, by the ſhortneſs of their necks and length of their legs. They often have recourſe to water plants, which they can readily get at by wading. They are very fond of the anagyris fœtida, or ſtinking bean trefoil, and will uncover the ſnow with their feet to get at it. In paſſing through the woods, they raiſe their heads to a horizontal poſition, to prevent their horns from being entangled in the branches. They have a ſingular gait: their pace is a ſhambling trot, but they go with great ſwiftneſs. In their common walk they lift their feet very high, and will without any difficulty ſtep over a gate 5 feet high. They feed principally in the night. They ruminate like the ox. They go to rut in autumn; are at that time very furious, ſeeking the female by ſwimming from iſle to iſle. Theſe bring two young at a birth, in April, which follow the dam a whole year. During the ſummer they keep in families. In deep ſnows they collect in numbers in the foreſts of pines, for protection from the inclemency of the weather under the ſhelter of thoſe ever-greens. They are very inoffenſive, except in the rutting ſeaſon; but when wounded, they will turn on the aſſailant, and attack him with their horns, or trample him to death beneath their great hoofs. Their fleſh is extremely ſweet and nouriſhing. The Indians ſay that they can travel three times farther after a meal of mooſe, then after any other animal food. The tongues are excellent; but the noſe is perfect marrow, and eſteemed the greateſt delicacy in Canada. The ſkin makes excellent buff; being ſtrong, ſoft, and light; yet ſo thick, that it is ſaid to reſiſt a muſket bullet. The Indians dreſs the hide, and, after ſoaking it for ſome time, ſtretch and render it ſupple by a lather of the brains in hot water. They not only make their ſnow-ſhoes of the ſkin, but, after a chaſe, form canoes with it; they ſew the ſkins neatly together, cover the ſeams with an unctuous earth, and embark in them with their ſpoils to return home. The hair on the neck, withers, and hams of a full-grown elk, is of much uſe in making mattreſſes and ſaddles; being by its great length well adapted for theſe purpoſes. The palmated parts of the horns are farther excavated by the ſavages, and converted into ladles, which will hold a pint. On all theſe accounts they are a principal object of chaſe. The ſavages perform it in different ways. See HUNTING. The opinion that this animal is ſubject to the epilepſy ſeems to have been univerſal, as well as the cure it finds by ſcratching its ear with the hind hoof till it draws blood. That hoof has been uſed in Indian medicine for that diſeaſe; they apply it to the heart of the afflicted, make him hold it in his left hand, and rub his ear with it. They uſe it alſo in the colic, pleuriſy, vertigo, and purple fever; pulveriſing the hoof, and drinking it in water. The Algonkins pretend that the fleſh communicates the diſeaſe; but it is notorious that the hunters live on it with impunity. The ſavages eſteem the mooſe a beaſt of good omen.

2. CERVUS ALCES FOSSILIS, or the Iriſh elk, is a variety deſcribed by Mr Kerr, as having palmated horns, vaſtly larger than thoſe of the elk, (N° 1.) very differently formed; meaſuring 8 feet long, and 14 between the tips; having long beams, and flatted brow antlers; very long ſnags on the palms, and one long ſnag on the inner edge of each palm. The horns are frequently dug up from peat bogs in Ireland, as well as ſometimes in Scotland, but the ſpecies has been long extirpated in both countries.

ii. CERVUS AXIS, the axis, has erect rounded horns, with 3 ſnags pointing upwards, and no brow antlers. The animals of this genus are very tame, and have the ſenſe of ſmelling in an exquiſite degree. They readily eat bread, but will refuſe a piece that has been breathed on: many oother animals of this genus, the antelope, and goat kind, do the ſame. Mr Kerr enumerates 4 varieties; viz.

1. CERVUS AXIS ALBUS, the white axis of Mr Pennant, has rough ſtrong three-forked horns; is about the ſize of a ſtag, but entirely white. It inhabits the dry hilly foreſts of Ceylon, Borneo, Celebes, and Java, but is reckoned a great rarity.

2. CERVUS AXIS MACULATUS, the ſpotted axis, or ſpeckled deer, has ſlender trifurcated horns; the firſt branch near the baſe, the 2d near the top; all pointing upwards. This ſpecies is about the

ſize of the fallow-deer; of a light red colour; the body beautifully marked with white ſpots; along the lower part of the ſides, next the belly, is a line of white; the tail long, red above, and white beneath. They are common on the banks of the Ganges, and in the iſle of Ceylon. This ſpecies bears the climate of Europe, having bred in the prince of Orange's Menagerie, at the Hague.

3. CERVUS AXIS MAJOR, the larger axis of Pennant, is of a reddiſh brown colour, and has very thick, large, ſtrong, and rugged three-forked whitiſh horns. It is as large as a horſe, and inhabits the marſhes of Borneo and Ceylon.

4. CERVUS AXIS UNICOLOR, the one-coloured or middle axis of Pennant, is of an uniform light red colour, but in all other reſpects reſembles the white axis; (N° 1.) except that this variety is much more numerous, going together in herds of ſeveral hundreds, and becoming very fat. It alſo inhabits the ſame countries, the natives of which cut the fleſh into ſmall pieces, which are ſalted and dried in the ſun for proviſions.

iii. CERVUS CAMELOPARDALIS, or the GIRAFFE, has ſimple, perſiſtent, ſtraight, unbranched horns, about 6 inches long, covered with hair, (or, according to Mr Kerr, with ſkin,) truncated at the end and tufted with black hair; and in the forehead a tubercle, about 2 inches high, reſembling a third horn. The fore legs are not much longer than the hind legs; but the ſhoulders are of a vaſt length, which gives the diſproportionate height between the fore and hind parts; the head is like that of a ſtag: the neck is ſlender and elegant, and on the upper ſide is a ſhort mane: the ears are large: tail long, with ſtrong hairs at the end: the colour of the whole animal a dirty white, marked with large broad ruſty ſpots. See *Plate* LV. Few of theſe animals have been ever ſeen in Europe. They inhabit the foreſts of Ethiopia, and other interior parts of Africa, almoſt as high as Senegal; but are not found in Guinea, or any of the weſtern parts; nor farther S. than about lat. 28. 10. The giraffe is very timid, but not ſwift; and has been repreſented as living only by browſing trees, being unable, from the diſproportionate length of its fore legs, to feed from the ground. But Mr Kerr ſays, "it grazes occaſionally, at which time it ſpreads its fore feet very wide." In leaping, it lifts up its fore legs and then its hind, like a horſe whoſe fore legs are tied. It runs very badly and aukwardly, and is very eaſily taken. All the accounts we have of the giraffe, agree in repreſenting its hind quarters as about 2½ feet lower than its withers: but from obſervations made by the late profeſſor Camper on a ſkeleton in the prince of Orange's collection, it appears, that naturaliſts have been greatly miſtaken in this particular. That its fore legs are longer than its hind legs, is indeed true; but the difference is not more than 7 inches, which, in a height of 7 feet, is not much. It may however be rendered apparently more conſiderable by the obliquity of the thigh bone with reſpect to the tibia, when compared with that of the humerus to the radius. The giraffe has always been celebrated for the gentleneſs of its diſpoſition. Antonius Conſtantius, in a letter to Galeas Manfredi, Prince of Faenza, dated Fano, 16th Dec. 1486, gives an account of a giraffe which he ſaw there. He ſays it was ſo gentle, that it would eat bread, hay, or fruit, out of the hand of a child; and that, when led through the ſtreet, it would take whatever food of this kind was offered to it by the ſpectators at the windows, as it paſſed along. This character is confirmed by Mr Gordon, who relates, that a giraffe, which he had wounded, ſuffered him to approach it as it lay on the ground, without offering to ſtrike with its horns, or ſhowing any inclination to revenge itſelf: he even ſtroked it over its eyes ſeveral times, when it only cloſed them, without any ſigns of reſentment. Its throat was afterwards cut for the ſake of its ſkin; and when in the pangs of death, it ſtruck the ground with its feet, with a force much exceeding that of any other animal, and theſe ſeem to be its principal means of defence. M. Voſmaer obſerves, that both the male and female are furniſhed with horns, which, from their ſize and form, ſeem intended merely for ornament: they appear to be excreſcences of the *os frontis*, and therefore are probably not deciduous. The notion of ſome writers, that the giraffe cannot feed from the ground, is confuted by the teſtimony of M. Vaillant, who aſſerts that it can even drink from a river, the ſurface of which is lower than the bank on which it ſtands. M. Voſmaer obſerves, that this account is confirmed by conſidering the ſtructure of the neck, the vertebræ of which are connected with thoſe of the back by a very ſtrong ligament. The giraffe here deſcribed, which Mr Gordon, who diſſected it, ſays was the largeſt he had ever ſeen, was 15 feet 4 inches Rhinland meaſure (about 15 feet 10 inches Engliſh) from the ground to the top of its head; the length of the body, from the cheſt to the rump, was 5 feet 7 inches Rhinland meaſure. M. Vaillant aſſerts, that he has ſeen ſeveral which were at leaſt 17 feet high; and M. Voſmaer declares, that he has been aſſured by ſome very reſpectable inhabitants of the Cape, that they had ſeen and killed giraffes, which, including the horns, were 23 Rhinland feet in height. The giraffe was known to the Romans in early times. It appears among the figures in the aſſemblage of eaſtern animals on the celebrated Præneſtine Pavement, made by the direction of Sylla; and is repreſented both grazing and browſing, in its natural attitudes. It was exhibited at Rome by Cæſar, among other animals in the Circæan games. Dr Gmelin and Mr Kerr rank this ſpecies as a diſtinct genus by itſelf.

iv. 1. CERVUS CAPREOLUS, the ROE-BUCK, has erect, cylindrical branched horns, and forked at the top. His ſize is only 3 feet 9 inches long, 2 feet 3 inches high before, and 2 feet 7 inches high behind: weight from 50 to 60 lb. Though the leaſt of the deer kind, his figure is moſt elegant and handſome. His eyes are more brilliant and animated than thoſe of the ſtag. (See N° vi.) His limbs are more nimble, his movements quicker, and he bounds ſeemingly without effort, with equal vigour and agility. His coat, or hair, is always clean, ſmooth, and gloſſy. He never wallows in the mire like the ſtag. He delights in dry and elevated ſituations, where the air is pureſt. He is likewiſe more crafty, conceals himſelf with greater addreſs, is more difficult to trace, and derives ſuperior reſources from inſtinct: for though he leaves a ſtronger ſcent than the ſtag, which redoubles the ardour and appetite of the dogs, he knows how to withdraw himſelf from their purſuit, by the rapidity with which he begins his flight and by his numerous doublings. As ſoon as he finds that the firſt efforts of a rapid flight have been unſucceſsful, he repeatedly returns on his former ſteps; and after confounding, by theſe oppoſite movements, the direction he has taken, after intermixing the preſent with the paſt emanations from his body, he riſes from the earth by a great bound, and, retiring to a ſide, he lies down flat on his belly; and in this immoveable ſituation he allows the whole troop of his deceived enemies to paſs very near him. The roe deer differs from the ſtag and fallow deer in diſpoſition, temperament, manners, and almoſt every natural habit. inſtead of aſſociating in herds, they live in ſeparate families. The father, mother, and young, go together, and never mix with ſtrangers. They are conſtant in their amours, and never unfaithful like the ſtag. As the females generally produce two fawns, the one male and the other female. theſe young animals, brought up and nouriſhed together, acquire ſo ſtrong a mutual affection, that they never quit each other, unleſs one of them meets with a misfortune, which never ought to ſeparate lovers. This attachment is more than love; for though always together, they feel the ardour of the rut but once a year, and it continues only 15 days, commencing at the end of October, and ending before the fifteenth day of November. They are not then like the ſtag, overloaded with fat: they have no ſtrong ſmell, no fury, in a word, nothing that can change the ſtate of their bodies. During this period, they indeed ſuffer not their fawns to remain with them. The father drives them off, as if he meant to oblige them to yield their place to thoſe which are to ſucceed, and to form new families for themſelves. However, after the rutting ſeaſon is paſt, the fawns return to their mother, and remain with her ſome time; after which they ſeparate for ever, and remove to a diſtance from the place which gave them birth. The female goes with young 5½ months, and brings forth about the end of April or beginning of May. She produces two at a time, which ſhe is obliged to conceal from the buck while very young. In 10 or 12 days they acquire ſtrength ſufficient to enable them to follow her. When threatened with danger, ſhe hides them in a cloſe thicket, and to preſerve them, preſents herſelf to be chaced. But notwithſtanding all her care and anxiety, the young are ſometime carried off by men, dogs, or wolves. Roe-bucks prefer a mountainous woody country to a plain one, They were formerly very common in Wales, in the north of England, and in Scotland; but at preſent the ſpecies nowhere exiſts in Great Britain, except in the Scottiſh Highlands. In France they are more frequent; they are alſo found in Italy, Sweden, and Norway; and in Aſia they are met with in Siberia. The firſt that are met with in Great Britain are in the woods on the S. ſide of Loch-Rannoch, in Perthſhire: the laſt in thoſe of Longwal, on the Southern borders of Caithneſs; but they are moſt numerous in the beautiful foreſts of Invercauld, in the midſt of the Grampian hills. They are unknown in Ireland. Wild roes, during ſummer, feed on graſs; and are very fond of the *rubus ſaxatilis*, called in the Highlands the roe-buck berry; but in winter, when the ground is covered with ſnow, they browſe on the tender branches of the fir and birch.

2. Cervus Capreolus Albus, the White Roe, is a variety mentioned from Buffon, by Mr Kerr, who deſcribes it as exactly like the other; excepting that it is pure white, and has black hoofs and noſe.

v. 1. Cervus Dama, or the Fallow-deer, Buck and Doe; with horns branched, compreſſed, and palmated at the top. The colour is various; reddiſh, deep brown, white or ſpotted. This ſpecies is not ſo univerſal as the ſtag; (N° vi.) it is rare in France and Germany. It is found in Greece, the Holy Land, and the north of China. They are very numerous in England; but, except on a few chaſes, confined in parks. There were none originally in America. They are eaſily tamed: and their fleſh, which is called *veniſon*, is in high eſteem among the luxurious. During rutting-time they will contend with each other for their miſtreſs, but are leſs fierce than the ſtag; (See N° vi.) during that ſeaſon, the male will form a hole in the ground, make the female lie down in it, and then often walk round and ſmell at her. Mr White, in his Natural Hiſtory of Pelborn, mentions, that the fallow deer, has two *ſpiracula*, or breathing places, beſides the noſtrils; probably analogous to the *puncta lachrymalia* in the human head. In order to drink, deer plunge their noſes very deep under water, and continue them in that ſituation for a conſiderable time; but, to obviate any inconveniency, they can open two vents, one at the inner corner of each eye, having a communication with the noſe. This ſeems to be an extraordinary proviſion of nature, for it looks as if theſe creatures could not be ſuffocated, though their mouths and noſtrils were both ſtopped. This curious formation of the head may be of ſingular ſervice to beaſts of chaſe, by affording them free reſpiration; and no doubt theſe additional noſtrils are thrown open when they are hard run. Mr Pennant has obſerved the ſame curious organization in the antelope. See Capra, § VII. This ſpecies is reckoned the Jachmur of the Scriptures.

2. Cervus Dama Foncong, a variety mentioned by Mr Moore; found on the banks of the Gambia, in the interior parts of Africa, near Barracunda; which he ſays differed not in form from the Engliſh fallow-deer; only that its ſize was equal to that of a ſmall horſe, and weighed 300 lb. It had alſo on its neck an erect black mane, 4 or 5 inches long.

vi Cervus Elaphus, the Stag, has long cylindrical ramified horns bent backwards, and ſlender ſharp brow antlers. The colour is generally a reddiſh brown with ſome black about the face, and a black liſt down the hind part of the neck and between the ſhoulders. Stags are common to Europe, Barbary, the north of Aſia, and America. In ſpring, they ſhed their horns, which fall off ſpontaneouſly, or by rubbing them gently againſt the branches of trees. It is ſeldom that both horns fall off at the ſame time, the one generally preceding the other a day or two. The old ſtags caſt their horns firſt, which happens about the end of February or beginning of March. An aged ſtag, or one in his 7th year or upwards, caſt his horns about the middle of March; a ſtag of 6 years ſheds his horns in April; ſtags, from 3 to 5 years old, ſhed their horns in the beginning, and thoſe in their 2d year, not till the middle or end of May. But theſe rules do not always hold. The ſhedding of the horns is advanced by a mild, and retarded by a ſevere and long winter. As ſoon as the ſtags caſt their horns, they ſeparate, the young ones only keeping together. They advance into the cultivated country, and remain among bruſhwood during ſummer, till their horns are renewed. In this ſeaſon, they walk with their heads low to prevent their horns from rubbing againſt the branches; for they continue to have ſenſibility till they acquire their full growth. The horns of the oldeſt ſtags are not half completed in the middle of May; nor acquire their full length and hardneſs before the end of July. Thoſe of the younger ſtags are proportionally later both in ſhedding and being renewed. But as ſoon as they have acquired their full dimenſions and ſolidity, the ſtags rub them againſt the trees, to clear them of a ſkin with which they are covered. Soon after the ſtags have poliſhed their horns, they begin to feel the impreſſion of love. Towards the end of Auguſt or beginning of September, they leave the coppice, return to the foreſts, and ſearch for the hinds. They cry with a loud voice; their neck and throat ſwell; they become perfectly reſtleſs; they ſtrike their horns againſt trees and hedges; in a word, they ſeem to be tranſported with fury, and run from country to country till they find the hinds whom they compel into compliance; for the female at firſt avoids and flies from the male, and never ſubmits to his embraces till ſhe be fatigued with the purſuit. The old hinds likewiſe come in ſeaſon before the younger ones. When two ſtags approach the ſame hind, they muſt fight before they enjoy. If nearly equal in ſtrength, they threaten, paw the ground, ſet up terrible cries, and attack each other with ſuch fury, that they often inflict mortal wounds with the ſtrokes of their horns. The combat never terminates but in the defeat or flight of one of the rivals. The conqueror loſes not a moment in enjoying his victory, unleſs another rival approaches, whom he is again obliged to attack and repel. The oldeſt ſtags are always maſters of the field; being ſtronger and more furious than the young ones, who muſt wait patiently till their ſuperiors tire, and quit their miſtreſſes. Sometimes, however, the young ſtags accompliſh their purpoſes while the old ones are fighting, and, after a haſty gratification, fly off. The hinds prefer the old ſtags, becauſe they are much more ardent. They are likewiſe more inconſtant, having often ſeveral females at a time; and when a ſtag has but one hind, his attachment to her does not continue above a few days: He then leaves her, goes in queſt of another, with whom he remains a ſtill ſhorter time; and in this manner paſſes from one to another till he is perfectly exhauſted. This ardour of love laſts only 3 weeks, during which the ſtags take very little food, and neither ſleep nor reſt. Night and day, they are either walking, running, fighting, or enjoying the hinds. Hence at the end of the rutting ſeaſon, they are ſo meagre and exhauſted, that they recover not their ſtrength for a conſiderable time. They generally retire to the borders of the foreſts, feed upon the cultivated fields, and remain there till their ſtrength is re-eſtabliſhed. The rutting ſeaſon of old ſtags commences about the beginning, and ends about the 20th September.—In thoſe of 6 or 7 years old, it begins about the 10th Sept. and concludes in the beginning of October. In young ſtags, or thoſe in their 3d, 4th, or fifth year, it begins about the 20th Sept. and terminates about the 15th Oct.; and at the end of October, the rutting is all over, excepting among the *prickets*, or thoſe which have entered into their 2d year, which are lateſt of coming into ſeaſon. Hence, at the beginning of November, the ſeaſon of love is entirely finiſhed; and the ſtags, during this period of weakneſs, are eaſily hunted. In ſeaſons when acorns and nuts are plentiful, the ſtags ſoon recover their ſtrength, and a ſecond rutting frequently happens at the end of October; but it is of much ſhorter duration than the firſt. In climates warmer than that of France, the rutting time is more forward. Ariſtotle informs us, that, in Greece, it commences in the beginning of Auguſt, and terminates about the end of September. The hinds go with young 8 months and ſome days, and ſeldom produce more than one fawn. They bring forth in May or the beginning of June, and ſo anxiouſly conceal their fawns, that they often expoſe themſelves to be chaſed, with a view to draw off the dogs, and afterwards return to take care of their young. Some hinds never conceive. Theſe are fatter than thoſe which are prolific, and alſo come ſooneſt in ſeaſon. The young are not called *fawns* or *calves* after the 6th month: The knobs of their horns then begin to appear, and they get the name of *knobbers* till their horns lengthen into *ſpears*, and then they are called *brocks* or *ſtaggards*. During the firſt ſeaſon, they never leave their mothers. In winter, the ſtags and hinds, of all ages, keep together in flocks, which are always more numerous in proportion to the rigour of the ſeaſon. They ſeparate in ſpring; The hinds retire to bring forth; and, during this period, the flocks conſiſt only of knobbers and young ſtags. In general, the ſtags are inclined to aſſociate, and nothing but fear or neceſſity obliges them to diſperſe. The life of the ſtag is ſpent in alternate plenty and want, vigour and debility, health and ſickneſs, without having any change introduced into his conſtitution by theſe oppoſite extremes. He lives as long as other animals which are not ſubjected to ſuch viciſſitudes. He grows 5 or 6 years, and lives to 35 or 40 years. What has been reported, concerning the longevity of the ſtag, is only a popular prejudice, which prevailed in the days of Ariſtotle, and which that philoſopher conſidered as improbable: though it has been renewed by an account of a ſtag taken by Charles VI. in the foreſt of Senlis, with a collar, upon which was written, *Cæſar hoc mihi donavit.* The love of the marvellous inclined men to believe that this animal had lived 1000 years, and had his collar from a Roman emperor, inſtead of ſuppoſing that he came from Germany, where all the emperors take the name of *Cæſar*. The ſtag has a fine eye, an acute ſmell, and an excellent ear. When liſtening, he raiſes his head, erects his ears, and hears from a great diſtance. When he is going into a coppice, or other half covered place, he ſtops to look round him on all ſides, and ſcents the wind, to diſcover if any object is near that might diſturb him. He is a ſimple, and yet a curious and crafty animal. When hiſſed or called to from a diſtance, he ſtops ſhort, and looks ſtedfaſtly, and with a kind of admiration, at carriages, cattle, or men; and if they have neither arms nor dogs, he moves on unconcernedly, and without flying. He appears to liſten, with great tranquillity and delight, to the ſhepherd's pipe; and the hunters ſometimes employ this artifice to deceive him. In general, he is leſs afraid of men than of dogs, and is never ſuſpicious, or uſes any arts of concealment, but in proportion to the diſturbances he has received. He eats ſlow, and has a choice in the aliment; and after his ſtomach is full, he lies down, and ruminates at leiſure. He ſeems to ruminate with leſs facility than the ox. It is only by violent ſhakes that the ſtag can make the food riſe from the firſt ſtomach. This difficulty proceeds from the length and direction of the paſſage through which the aliment has to go. The neck of the ox is ſhort and ſtraight, but that of the ſtag is long and arched; and therefore greater efforts are neceſſary to raiſe the food. Theſe efforts are made by a kind of hiccup, the movement of which is apparent, and continues during the time of rumination. His voice is ſtronger and more quivering, in proportion as he advances in years. The voice of the hind is ſhorter and more feeble. She never bellows from love, but from fear. The ſtag, during the rutting ſeaſon, bellows dreadfully: He is then ſo tranſported, that nothing terrifies him. He is therefore eaſily ſurpriſed; as he is loaded with fat, he cannot keep long before the dogs. But he is dangerous when at bay, and attacks the dogs with fury. He drinks none in winter nor in ſpring, the dews and tender herbage being then ſufficient to extinguiſh his thirſt; but during the parching heats of ſummer, to obtain drink, he frequents the brooks, the marſhes, and the fountains; and in the ſeaſon of love, he is ſo over-heated, that he ſearches every where for water, not only to ſatisfy his immoderate thirſt, but to bathe and refreſh his body. He then ſwims eaſier than at any other time, and has been obſerved croſſing very large rivers. It has even been alleged, that attracted by the odour of the hinds, the ſtags in the rutting ſeaſon, throw themſelves into the ſea, and paſs from one iſland to another at the diſtance of ſeveral leagues. They leap ſtill more nimbly than they ſwim; for, when purſued, they eaſily clear a hedge or a pale fence of 6 feet high. Their food varies in different ſeaſons. In autumn, after rutting, they ſearch for the buds of green ſhrubs, the flowers of broom or heath, the leaves of brambles, &c. During the ſnows of winter, they feed upon the bark, moſs, &c. of trees; and in mild weather, they browſe in the wheat fields. In the beginning of ſpring, they go in queſt of the catkins of the poplar, willow, and hazel trees, the flowers and buds of the cornel tree, &c. In ſummer when they have great choice, they prefer rye to all other grain, and the black berry-bearing alder to all other wood. The fleſh of the fawn is very good: that of the hind and knobber not bad; but that of the ſtag has always a ſtrong and diſagreeable taſte. The ſkin and the horns are the moſt uſeful parts of this animal. The ſkin makes a pliable and very durable leather. The horns are uſed by cutlers, ſword ſlippers, &c. and a volatile ſpirit, much employed in medicine, is extracted from them by chymiſts. In America, ſtags feed eagerly on the broad-leaved kalmia; yet that plant is poiſon to all other horned animals: their inteſtines are found filled with it during winter. If their entrails are given to dogs, they become ſtupified, and as if drunk, and often are ſo ill as hardly to eſcape with life. The American ſtags grow very fat: their tallow is much eſteemed for candles. The Indians ſhoot them. See Hunting. Their ſkins are an article of commerce imported by the Hudſons's Bay company; but brought from the diſtant parts far inland by the Indians, who bring them from the neighbourhood of the lakes. In moſt parts of North America they are called the grey mooſe, and the elk; this has given occaſion to the miſtaken notion of that great animal being found in Virginia and many other ſouthern provinces. In Britain, the ſtag is become leſs common than formerly; its exceſſive viciouſneſs during the rutting ſeaſon, and the badneſs of its fleſh, induce moſt people to part with the ſpecies. Stags are ſtill found wild in the Highlands of Scotland, in herds of 400 or 500 ranging at full liberty over the vaſt hills of the north. Formerly the great Highland chieftains uſed to hunt with the magnificence of eaſtern monarchs, aſſembling 4000 or 5000 of their clan, who drove the deer into the toils or to the ſtations the lairds had placed themſelves in: but as this pretence was frequently uſed to collect their vaſſals for rebellious purpoſes, an act was paſſed prohibiting any aſſemblies of this nature. Stags are likewiſe met with on the moors that border Cornwall and Devonſhire; and in Ireland on the mountains of Kerry, where they add greatly to the magnificence of the romantic ſcenery on the lake of Killarny. The ſtags of Ireland during its uncultivated ſtate, and while it remained an almoſt boundles tract of foreſt, had an exact agreement in habit with thoſe that range at preſent through the wilds of America. They were leſs in body, but very fat; and their horns of a ſize far ſuperior to thoſe of Europe, but in form they agreed in all points. Of this ſpecies, Mr Kerr enumerates 4 varieties; viz.

1. Cervus Elaphus Canadensis, the Canadian Stag of Erxleben, and American Stag of Cateſby, is diſtinguiſhed by having very large horns.

2. Cervus Elaphus Corsicanus, the Corſican Stag, or ſmall Red Deer of Buffon, has ſtraight antlers, and is of a deep brown colour.

3. Cervus Elaphus Hippelaphus, the German, or Maned Stag of Erxleben, is of a large ſize, and has long hair on the neck, with round horns, turned inwards at the ſides.

4. Cervus Elaphus minutus, the Chineſe

Stag of Du Halde, is about the ſize of a common dog, and inhabits the province of Sunnan in China.

vii. Cervus Guineensis, the Guinea Deer of Dr Gmelin, and Grey Deer of Mr Pennant, is about the ſize of a cat, of a greyiſh colour, and black underneath. It is a native of Guinea, and the ſize and figure of its horns have not been hitherto deſcribed with any preciſion. Mr Kerr "is doubtful whether it belongs to the genus of deer, muſk or antelope."

viii. Cervus Mexicanus, *the Mexican Deer* of Pennant, the *Baieu* of Bancroft, and the *Biche de Bois* of Barrere, has ſtrong thick rugged horns, bending forwards, three forked at their extremities, with one erect ſnag, about two inches above the baſe. It is of a reddiſh colour, ſpotted with white when young, and is about the ſize of a roe. The head is large, the eyes bright, and the neck thick. They inhabit New Spain, Guiana and Braſil. The fleſh is inferior to veniſon.

ix. Cervus Muntjac, the *Muntjac* of Schreber, or the *Rib-faced Deer* of Pennant, has 3 longitudinal ribs extending from the horns to the eyes, and a tuſk hanging out from each ſide of the upper jaw. It inhabits Java and Ceylon; is leſs than the roe (N° iv.) and reſembles the Porcine deer (N° x.) in ſhape. The horns are placed on a boney proceſs which riſes 3 inches above the ſkull and is covered with hair. They are three-forked, the upppermoſt branch being hooked. The fleſh is much eſteemed.

x. 1. Cervus Porcinus, the Porcine, or hog Deer of Pennant, has ſlender trifurcated horns, 13 inches long: the body is thick and clumſy; the legs fine and ſlender: The upper part of the neck, body, and ſides, brown; belly and rump, of a lighter colour. They are found in Bengal, and Borneo. They are taken in ſquare pit-falls, about 4 feet deep, covered with ſome ſlight materials. Of their feet, as well as thoſe of the leſſer ſpecies of muſks and antelope, are made tobacco-ſtoppers. The tail is 8 inches long.

2. Cervus Porcinus maculatus, the ſpotted Porcine Deer, or Hog Stag of Buffon, differs from the above variety (N° 1.) chiefly in colour, being yellowiſh marked with white ſpots. The top of the back is browniſh; the tail yellow above and white below, and the legs dark brown. The firſt ſnag of the horns is very near the head.

xi. Cervus Pygargus, the *Aba* of Gmelin, and the *Tail-leſs Roe* of Pennant has three-forked horns, but no tail. It inhabits the woody mountains of Ruſſia and Siberia, beyond the Volga, and in Hircania. It reſembles the roe, but is much larger; is of the ſame deep red, with a large bed of white on the buttocks extending up the back. The fur is very thick; and on the belly and limbs yellowiſh. The horns are very rugged at the baſes and full of knobs. At the approach of winter it becomes hoary and deſcends into the plains.

xii. Cervus Tarandus, the Rein Deer, is a native of Lapland, and the northern parts of Europe, Aſia, and America. The horns are large, cylindrical, branched, bent forwards, and palmated at the ends. Two of the branches hang over the face. It is about the ſize of a buck, of a dirty whitiſh colour; the hairs of his ſkin are thick and ſtrong. To the Laplanders this animal is the ſubſtitute of the horſe, the cow, the goat, and the ſheep; and is their only wealth: the milk affords them cheeſe; the fleſh, food; the ſkin, cloathing; the tendons, bow-ſtrings; and when ſplit, thread; the horns, glue; the bones, ſpoons. During winter it ſupplies the want of a horſe, and draws their ſledges with amazing ſwiftneſs over the frozen lakes and rivers, or over the ſnow, which at that time covers the whole country. A Laplander is rich, who is poſſeſſed of a herd of 1000 rein deer. In autumn they ſeek the higheſt hills, to avoid the Lapland gad-fly, which at that time depoſits its eggs in their ſkin; it is the peſt of theſe animals, and numbers die that are thus viſited. The moment a ſingle fly appears, the whole herd inſtantly perceives it; they fling up their heads, toſs about their horns, and at once attempt to fly for ſhelter amidſt the ſnows of the loftieſt Alps. In ſummer they feed on ſeveral plants; but during winter on the rein liverwort, (a ſpecies of Lichen,) which lies far beneath the ſnow, which they remove with their feet and palmated brow antlers. The Samoieds, leſs intelligent than the Laplanders, conſider them in no other view than as animals of draught, to convey them to the chaſe of the wild reins; which they kill for the ſake of the ſkins, either to clothe themſelves, or to cover their tents. They know not the cleanly delicacy of the milk or cheeſe; but prefer for their repaſt the inteſtines of beaſts, or the half-putrid fleſh of a horſe, ox, or ſheep, which they find dead on the high road.—The Koreki, a nation of Kamtſchatka, may be placed on a level with the Samoieds. They keep immenſe herds of reins; ſome of the richeſt to the amount of 10 or 20,000; yet ſo ſordid are they as to eat none except ſuch as they kill for the ſake of the ſkins; an article of commerce with their neighbours the Kamtſchatkans; otherwiſe they content themſelves with the fleſh of thoſe which die by diſeaſe or chance. They train them in the ſledge, but neglect them for every domeſtic purpoſe. Their hiſtorian ſays, they couple two to each carriage; and that the deer will travel 150 verſts in a day, that is, 112 Engliſh miles. They caſtrate the males by piercing the ſpermatic arteries, and tying the ſcrotum tight with a thong.—The ſavage and uninformed Eſkimaux and Greenlanders, who poſſeſs, amidſt their ſnows, theſe beautiful animals, neglect not only the domeſtic uſes, but even are ignorant of their advantage in the ſledge. The fleſh of the rein is the moſt coveted part of their food; they eat it raw, dreſſed, and dried and ſmoked with the ſnow lichen. The wearied hunters will drink the raw blood; but it is uſually dreſſed with the berries of the heath: they eagerly devour the contents of the ſtomach, but uſe the inteſtines boiled. They are very fond of the fat, and will not loſe the leaſt bit. The ſkin, ſometimes a part of their clothing, dreſſed with the hair on, is ſoft and pliant; it forms alſo the inner lining of their tents, and moſt excellent blankets. The tendons are their bow-ſtrings, and when ſplit are the threads with which they ſew their jackets. The rein-deers are found in the neighbourhood of Hudſon's Bay, in moſt amazing numbers, columns of 8000 or 10,000 are ſeen annually paſſing from N. to S. in March and April, driven out of the woods by the muſketoes; ſeeking refreſhment on the ſhore, and a quiet place to drop their young. They go to rut in September; and the males ſoon after ſhed their horns; they are at that ſeaſon very fat, but ſo rank and muſky as not to be eatable. The females drop their young in June, in the moſt ſequeſtered ſpots they can find; and then they likewiſe loſe their horns. Beaſts of prey follow the herds: firſt, the wolves, who ſingle out the ſtragglers (for they fear to attack the drove,) detach and hunt them down: the foxes attend at a diſtance, to pick up the offals left by the former. In autumn the deer with the fawns re-migrate northward. The Indians are very attentive to their motions; for the rein forms the chief part not only of their dreſs but of their food. They often kill multitudes for the ſake of their tongues only; but generally they ſeparate the fleſh from the bones, and preſerve it by drying it in the ſmoke; they alſo ſave the fat, and ſell it to the Engliſh in bladders, who uſe it in frying inſtead of butter. The ſkins are alſo an article of commerce, and uſed in London by the breeches-makers. The Indians ſhoot them in winter. Mr Kerr diſtinguiſhes 3 varieties of this ſpecies, viz.

1. Cervus Tarandus Caribou, the Canadian Rein Deer; with ſtraight horns, and a ſingle ſnag, turned forward at the baſe of each.

2. Cervus Tarandus Groenlandicus, the Greenland Rein Deer, with horns entirely rounded and covered with a hairy ſkin. The noſe is much covered with hair.

3. Cervus Tarandus Rangifer, the common Rein Deer, with all the upper parts of the horns, both of the main branches and the brow antlers palmated.

xiii. Cervus Virginianus, the Virginian Deer of Mr Pennant, has ſlender horns, bending much forwards, very ſlightly palmated at the extremities, with numerous branches on the interior edges, but no brow antlers. It inhabits Virginia and Carolina, greatly reſembles the fallow deer, but is higher at the ſhoulders, and has a longer tail and longer legs. The colour is a cinereous brown or aſh colour. Theſe animals are gregarious; very active, reſtleſs, and eaſily domeſticated. They are extremely numerous in all the territory S. of Canada; but eſpecially in the vaſt ſavannas contiguous to the Miſſiſippi, and the great rivers which flow into it. They graze in herds innumerable, along with the ſtags and buffaloes. They are capable of being tamed, and when properly trained, are uſed by the Indians to decoy the wild deer, (eſpecially in the rutting ſeaſon,) within ſhot. Both bucks and does herd from September to March; after that they ſeparate, and the does ſecrete themſelves to bring forth, and are found with difficulty. The bucks from this time keep ſeparate till the amorous ſeaſon of September revolves. The deer begin to feed as ſoon as night begins; and ſometimes, in the rainy ſeaſon, in the day; otherwiſe they ſeldom or never quit their haunts. An old American ſportſman has remarked, that the bucks will keep in the thickets for a year, or even two. Thoſe which live near the ſhores are lean, ſubject to worms in their head and throats, generated from the eggs depoſited in thoſe parts. Thoſe that frequent the hills and ſavannas are in better caſe. In hard winters they will feed on the long moſs which hangs from the trees in the northern parts. Theſe and other cloven footed quadrupeds of America are very fond of ſalt, and reſort eagerly to the places impregnated with it. They are always ſeen in great numbers in the ſpots where the ground has been torn by torrents or other accidents, where they are ſeen licking the earth. Such ſpots are called *licking places*. The huntſmen are ſure of finding the game there; for notwithſtanding they are often diſturbed, the buffaloes and deer are ſo paſſionately fond of the ſavoury regale, as to bid defiance to all danger, and return in droves to their favourite haunts See Hunting. The number of deer deſtroyed in ſome parts of America is incredible. It is pretended, that ſavages have an abſurd idea, that the more they deſtroy, the more they ſhall find in ſucceeding years. Certain it is that multitudes are deſtroyed; the tongues only preſerved, and the carcaſes left a prey to wild beaſts. But the motive is much more political. It reſembles the policy of our Eaſt India company, who ſome years ago burnt great quantities of their tea to the amount of many thouſand pounds, rather than lower the price of it. Accordingly, the ſavages, diſcerning, that ſhould they overſtock the market, they would certainly be over reached by the European dealers, who take care never to produce more goods than are barely ſufficient for the demand of the ſeaſon, eſtabliſhing their prices according to the quantity of furs brought by the natives. The ſkins afford excellent pliable leather for gloves and breeches.

(II.) Cervus volans, in entymology, a name given by authors to the ſtag-fly, or horned beetle, a very large ſpecies of beetle with horns ſloped, and ſomething like thoſe of the ſtag. It is found in Eſſex.

CERYX, in antiquity, a ſort of public crier, appointed to proclaim or publiſh things aloud in aſſemblies. The *ceryx* among the Greeks anſwered to the præco among the Romans. Our criers have only a ſmall part of their office and authority. There were two kinds of ceryces, *civil* and *ſacred*. The former were thoſe appointed to call aſſemblies and make ſilence therein; alſo to go on meſſages, and do the office of our heralds, &c. The ſacred ceryces were a ſort of prieſts, whoſe office was to proclaim ſilence in the public games and ſacrifices, publiſh the names of the conquerors, proclaim feaſts and the like. The prieſthood of the ceryces was annexed to a particular family, the deſcendants of Ceryx, ſon of Eumolphus. To them it alſo belonged to lead ſolemn victims to ſlaughter. Before the ceremonies began, they called ſilence in the aſſembly, by the formula, *Ευφημειτε σιγη πας εϛω λαος*; anſwering to the *favete linguis* of the Romans. When the ſervice was over, they diſmiſſed the people with this formula, *Λαων αφεσις*, *Ite, miſſa eſt*.

CESANA, a county of the late Maritime diviſion of Auſtria, in Treviſo, near Feltrino. It contains ſeven large villages, ſubdivided into many ſmall ones ſcattered about the mountains.

CESAR. See Cæsar.

CESARE, among logicians, one of the modes of the ſecond figure of ſyllogiſms; the minor propoſition of which is an univerſal affirmative, and the other two univerſal negatives; thus,

cE No immoral books ought to be printed;
sA But every obſcene book is immoral;
rE Therefore no obſcene books ought to be printed.

CESARIA. See Cæsarea.

* **CESAREAN.** *adj.* [from *Cæſar.*] The *Ceſarean* ſection is cutting a child out of the womb, either dead or alive, when it cannot otherwiſe be delivered. Which circumſtance, it is ſaid, firſt gave the name of *Cæſar*, to the Roman family ſo called. *Quincy.*

CESE, a river of France, in the department of Herault. Gold is found in its channel.

CESENA, a town of Romagna, in Italy, ſeated on the river Savio, 15 miles S. of Ravenna. Lon. 12. 20. E. Lat. 44. 25. N.

CESENATICO, a town of the late Italian republic, in the dep. of Rubicon, near the ſea, moſtly inhabited by fiſhermen. It has a good harbour and a well conſtructed canal, on the bridge over which ſtands two marble Corinthian pillars. The inhabitants of this town having arreſted a meſſenger with diſpatches, the Engliſh, in 1800, ſet fire to the moles of the harbour, and burnt or ſunk 16 veſſels that were therein.

(1.) **CESPITOSÆ** plantæ, [from *ceſpes*, turf or ſod,] plants which produce many ſtems from one root, and thence form a cloſe thick carpet on the ſurface of the earth.

(2.) Cespitosæ paludes, turf bogs.

* **CESS.** *n. ſ.* [probably corrupted from *cenſe*; ſee Cense; though imagined by *Junius* to be derived from *ſaiſire*, to ſeize.] 1. A levy made upon the inhabitants of a place rated according to their property.—The like *ceſs* is alſo charged upon the country ſometimes for victualling the ſoldiers, when they lie in garriſon. *Spenſer.* 2. The act of laying rates. 3. [from *ceſſe*, Fr.] It ſeems to have been uſed by *Shakeſpeare* for bounds, or limits, though it ſtands for *rate, reckoning.*—I pr'ythee, Tom, beat Cutts's ſaddle, put a few flocks in the point; the poor jade is wrung in the withers out of all *ceſs. Shakeſp. Henry* IV.

(1.) * *To* Cess. *v. a.* [from the noun.] To rate; to lay charge on.—We are to conſider how much land there is in all Ulſter, that, according to the quantity thereof, we may *ceſs* the ſaid rent, and allowance iſſuing thereout. *Spenſer on Ireland.*

(2.) * *To* Cess. *v. n.* To omit a legal duty. See Cessor.

CESSARES, a territory of S. America, N. of Patagonia, inhabited by a race of S. American Indians, deſcended from Spaniards, the crews of three Spaniſh ſhips wrecked on that coaſt, in 1540, who afterwards intermarried with the natives. Lat. 48. 0 S.

(1.) * **CESSATION.** *n. ſ.* [*ceſſatio*, Lat.] 1. A ſtop: a reſt.—The day was yearly obſerved as a feſtival, by *ceſſation* from labour, and by reſorting to church. *Hayward.* 2. Vacation; ſuſpenſion.—There had been a mighty confuſion of things, an interruption and perturbation of the ordinary courſe, and a *ceſſation* and ſuſpenſion of the laws of nature. *Woodward.* 3. End of action; the ſtate of ceaſing to act.—The ſerum, which is mixed with an alkali, being poured out to that which is mixed with an acid, raiſeth an efferveſcence; at the *ceſſation* of which, the ſalts of which the acid was compoſed, will be regenerated. *Arbuthnot on Aliments.* 4. A pauſe of hoſtility, without peace.—When the ſuccours of the poor proteſtants in Ireland were diverted, I was intreated to get them ſome reſpite, by a *ceſſation. King Charles.*

(2.) Cessation of arms. See § 1. *def.* 4. When the commander of a place finds things reduced to an extremity, ſo that he muſt either ſurrender, or ſacrifice the garriſon and inhabitants to the mercy of the enemy, he plants a white flag on the breach, or beats the chamade; on which a ceſſation of hoſtilities commences, to give time for a capitulation.

* **CESSAVIT.** *n. ſ.* [Lat.] A writ that lies upon this general ground, that the perſon, againſt whom it is brought, hath, for two years, omitted to perform ſuch ſervice, or pay ſuch rent, as he is obliged by his tenure, and hath not, upon his land or tenement, ſufficient goods or chattels to be diſtrained. *Cowel.*

* **CESSIBILITY.** *n. ſ.* [from *cedo, ceſſum*, Lat.] The quality of receding, or giving way, without reſiſtance.—If the ſubject ſtrucken be of a proportionate *ceſſibility*, it ſeems to dull and deaden the ſtroke; whereas if the thing ſtrucken be hard, the ſtroke ſeems to loſe no force, but to work a greater effect. *Digby on the Soul.*

* **CESSIBLE.** *adj.* [from *cedo, ceſſum*, Lat.] Eaſy to give way.—If the parts of the ſtrucken body be ſo eaſily *ceſſible*, as without difficulty the ſtroke can divide them, then it enters into ſuch a body, till it has ſpent its force. *Digby on the Soul.*

CESSIO bonorum, in Scots law, an action by which an inſolvent debtor may apply for liberation from priſon, upon making over the whole real and perſonal eſtate to his creditors.

(1.) * **CESSION.** *n. ſ.* [*ceſſion*, Fr. *ceſſio*, Lat.] 1. Retreat; the act of giving way.—Sound is not produced without ſome reſiſtance either in the air or the body percuſſed; for if there be a mere yielding or *ceſſion*, it produceth no ſound. *Bacon's Nat. Hiſt.* 2. Reſignation; the act of yielding up or quitting to another.—A parity in their council would make and ſecure the beſt peace they can with France, by a *ceſſion* of Flanders to that crown, in exchange for other provinces. *Temple.*

(2.) Cession, in law, an act by which a perſon ſurrenders and tranſmits to another perſon a right which belonged to himſelf. Ceſſion is more particularly uſed in the civil law for a voluntary ſurrender of a perſon's effects to his creditors, ſo avoid impriſonment. See Bankrupt, § 5. In ſeveral places the ceſſion carried with it a mark of infamy, and obliged the perſon to wear a green cap or bonnet; at Lucca, an orange one: to neglect this was to forfeit the privileges of the *ceſſion.* This was originally intended to ſignify that the ceſſionary was become poor through his own folly. The Italian lawyers deſcribe the ceremony of the ceſſion to conſiſt in ſtriking the bare breech 3 times againſt a ſtone, called Lapis Vituperii, in preſence of the judge. Formerly it conſiſted in giving up the girdles and keys in court: the ancients uſing to carry at their girdles the chief utenſils wherewith they got their living; as the ſcrivener his eſcritoire, the merchant his bag, &c. The form of ceſſion among the ancient Gauls and Romans was as follows: The ceſſionary gathered up duſt in his left hand from the four corners of the houſe, and ſtanding on the threſhold, holding the door-poſt in his right hand, threw the duſt back over his ſhoulder; then ſtripping to the ſhirt, and quitting his girdle and bags, he jumped with a pole over a hedge; hereby letting the world know, that he had nothing left, and that when he jumped all he was worth was in the air with him. This was the ceſſion in criminal matters. In civil caſes, it was ſufficient to lay a broom, a ſwitch, or a broken ſtraw, on the threſhold; this was called *chrenecruda per durpilium et feſtucam.*

(3.) Cession, in the eccleſiaſtical law, is when an eccleſiaſtical perſon is created a biſhop or without diſpenſation, or being otherwiſe qualified. In both theſe caſes, their firſt benefices become void by ceſſion, without any reſignation: To thoſe livings that the perſon had, who was created biſhop, the king may preſent for that time, whoſoever be patron: and in the other caſe the patron may preſent: but by diſpenſation of retainder, a biſhop may retain ſome or all the preferments he had, before he he was made biſhop.

* CESSIONARY. *adj.* [from *ceſſion.*] As, a *ceſſionary* bankrupt, one who has delivered up all his effects. *Martin.*

* CESSMENT. *n. ſ.* [from *ceſs.*] An aſſeſſment or tax. *Dict.*

* CESSOR. *n. ſ.* [from *ceſſo*, Lat.] In law, he that ceaſeth or neglecteth ſo long to perform a duty belonging to him, as that by ceſs, or ceſſing, he incurreth the danger of law, and hath or may have the writ ceſſavit brought againſt him. Where it is ſaid the tenant ceſſeth, ſuch phraſe is to be underſtood as if it were ſaid, the tenant ceſſeth to do that which he ought, or is bound to do by his tenement. *Cowel.*

CESSUS, in old records, an aſſeſſment.

CESTON, or Cestum. See Cestus.

CESTRATUM, a work enamelled, or painted with a cestron.

CESTRE, a river of Africa, in Guinea.

CESTRIA, the ancient name of Chester.

CESTRON, in antiquity, an inſtrument for painting or enamelling in horn or ivory.

CESTRUM, bastard Jasmine, a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 28th order, *Luridæ*. The corolla is funnel ſhaped; the ſtamina each ſending out a little tooth about the middle of the inſide. There are 6 ſpecies, all natives of the warmeſt parts of America; ſo cannot be preſerved in this country without artificial heat. They are flowering ſhrubs, riſing in height from 5 to 12 feet, with flowers of a white or pale yellow colour. The flowers of one ſpecies, called *Badmington Jaſmine*, emit a ſtrong ſcent after ſunſet. They may be propagated either by ſeed or cuttings.

CESTUI, a French word, ſignifying *he* or *him*, frequently uſed in the Engliſh law writings. Thus

1. Cestui qui trust, a perſon who has, lands, &c. committed to him for the benefit of another; and if ſuch perſon does not perform his truſt, he is compellable to it in chancery.

2. Cestui qui vie, one for whoſe life any lands, &c. are granted.

3. Cestui qui use, a perſon to whoſe uſe any one is infeoffed of lands or tenements. Formerly the feoffees to uſes were deemed owners of land, but now the poſſeſſion is adjudged in *ceſtui qui uſe.*

(1.) * CESTUS. *n. ſ.* [Latin.] The girdle of Venus.—Venus, without any ornament but her own beauties, not ſo much as her own *ceſtus. Addiſon's Spectator.*

(2.) Cestus, Cestum, or Ceston, among the ancient poets, was a fine embroidered girdle, ſaid to be worn by Venus, to which Homer aſcribes the power of charming and conciliating love. The word comes from κεστος, *a girdle*; whence alſo incestus, a term uſed at firſt for any indecency by looſening the girdle, &c. but now reſtrained to that between perſons near akin.

(1.) * CETACEOUS. *adj.* from *cete*, whales, Lat.] Of the whale kind.—Such fiſhes as have lungs or reſpiration, are not without the wezzon, as whales and *cetaceous* animals. *Brown's Vul. Err.* —He hath created variety of theſe *cetaceous* fiſhes, which converſe chiefly in the northern ſeas, whoſe whole body being encompaſſed round with a copious fat or blubber, it is enabled to abide the greateſt cold of the ſea-water. *Ray on the Creation.*

(2.) Cetaceous fish have no gills; there is an orifice on the top of the head, through which they breathe and eject water; and they have a flat or horizontal tail. The internal ſtructure of this tribe agrees in all reſpects with that of quadrupeds; and in a few others the external parts in both are ſimilar. Cetaceous fiſh, like land animals, breathe by means of lungs, being deſtitute of gills. This obliges them to riſe frequently to the ſurface of the water to reſpire, to ſleep on the ſurface, as well as to perform ſeveral other functions. They have the power of uttering ſounds, ſuch as bellowing and making other noiſes denied to genuine fiſh. Like land animals they have warm blood, are furniſhed with organs of generation, copulate, bring forth, and ſuckle their young, ſhowing a ſtrong attachment to them. Their bodies beneath the ſkin are entirely ſurrounded with a thick layer of fat, analagous to the lard on hogs. The number of their fins never exceeds 3, viz. two pectoral fins, and one back fin; but in ſome ſpecies the laſt is wanting. Their tails are placed horizontally, or flat in reſpect to their bodies; contrary to the direction of thoſe of all other fiſh, which have them in a perpendicular ſite. This ſituation of the tail enables them to force themſelves ſuddenly to the ſurface of the water to breathe, which they are ſo frequently conſtrained to do. Many of theſe circumſtances induced Linnæus to place this tribe among his mammalia, or what other writers call quadrupeds. See Zoology. To preſerve the chain of beings entire, he ſhould in this caſe have made the genus of phocæ, or *ſeals*, and that of the trichecus or manati, immediately precede the whale, thoſe being the links that connect the mammalia or quadrupeds with the fiſh: for the ſeal is, in reſpect to its legs the moſt imperfect of the former claſs; and in the manati the hind feet coaleſce, aſſuming the form of a broad horizontal tail. Notwithſtanding the many parts and properties which cetaceous fiſh have in common with land animals, yet there ſtill remain others which render it more natural to place them, with Ray, in the rank of fiſh: the form of their bodies agree with that of fiſh; they have no feet; they are entirely naked, or covered only with a ſmooth ſkin; they live conſtantly in the water, and have all the action of fiſh.

CETE, the name of Linnæus's 7th order of mammalia, comprehending the MONODON, BALÆNA, PHYSETER, and DELPHINUS.

CETEF, a river of Africa, which runs through Metija, in Barbary, and falls into the ſea, 5 miles W. of Algiers.

CETOBRICA. See SETOBRIGA.

CETTE, a maritime town of France, in the department of Herault, and ci-devant province of Languedoc, ſeated at the place where the canal of Languedoc begins between Montpelier and Agde, on the bay of Maguelona in the Mediterranean. Lon. 3. 47. E. Lat. 43. 24. N.

(1.) CETUS, in aſtronomy, a large conſtellation of the ſouthern hemiſphere, under Piſces, and next the water of Aquarius. In the mandible of cetus is a variable ſtar which appears and diſappears periodically, paſſing through the ſeveral degrees of magnitude, in about 333 days. See ASTRONOMY, § 86, and 548.

(2.) CETES, in the mythology, is repreſented as the ſea monſter which Neptune, at the ſuit of the nymphs, ſent to devour ANDROMEDA for the pride of her mother, and which, being killed by Perſeus, was tranſlated to the ſtars.

CEVA, a town of Italy, in Piedmont, ſeated on the river Tanaro, with a ſtrong fort, 8 miles S. E. of Mondovi. Lon. 8. 10. E. Lat. 44. 26. N.

CEVENNES, mountains in the S. of France, in the ci-devant province of Languedoc, remarkable for the frequent meetings of the Proteſtants there, as a place of ſecurity againſt the tyranny of their popiſh governors. In queen Anne's reign an attempt was made to aſſiſt them by an Engliſh fleet in the Mediterranean; but to no purpoſe, for the French had occupied the paſſages. Fortunately, the age of bigotry is now over in France.

CEUTA, a maritime town of Africa, in Barbary, in the kingdom of Fez, ſeated on the ſtraits of Gibraltar, oppoſite to that place. John king of Portugal took it from the Moors in 1416, but it now belongs to Spain. In 1697, it ſuſtained a vigorous ſiege by the Moors. Lon. 5. 20. W. Lat. 35. 50. N.

CEYLON, a large iſland in the Eaſt Indies, ſituated at the entrance of the bay of Bengal, which bounds it on the N.: ſeparated from the coaſt of Coromandel by the gulf of Manaar, a narrow ſtrait, full of ſhoals, and impaſſable by large ſhips; and about 60 leagues from Cape Comorin, the ſouthern point of the peninſula of India. It is computed to be nearly 900 miles in circumference: in length about 300, from Point Pedro at the northern extremity to Donderhead at the ſouthern; but in breadth very irregular, ſome parts being only from 40 to 50 miles, and others extending to 60, 70, and even 100. On approaching the eaſtern coaſt, the appearance is rocky and barren, and on the SE. ſome reefs of rocks run out into the ſea, between Point de Galle and Batacala. From Point Pedro to Columbo, the N. and NW. coaſt is flat and much indented by inlets of the ſea, ſeveral of which form harbours; and one, extending almoſt the whole breadth of the iſland, from Mullipatti to Jafnapatam, on the NW. point. But the interior of Ceylon abounds with ſteep and lofty mountains, covered with wood, ſo thick and cloſely interwoven as to be almoſt impenetrable. The dominions of the king of Candy are entirely ſurrounded by the mountains and foreſts, which ſeem deſigned by nature as a fence to him from thoſe foreign enemies, who by artifice and power have wreſted from him the open tracts towards the ſea. This iſland being divided by a chain of lofty mountains almoſt into two parts, is ſo much ſeparated, as to make a great difference both in climate and ſeaſons. The monſoons, which ſet in periodically from the oppoſite ſides of theſe mountains, are alſo completely obſtructed by them; and thus not only the oppoſite ſea coaſt, but all the inland country is in a meaſure ſheltered from theſe deſtructive winds. There is a connection between the monſoons in Ceylon and thoſe on the Coromandel and Malabar coaſts; but on the weſtern ſide of the iſland they ſet in much earlier than on the eaſtern ſide: on the former, about Columbo, the rains prevail in May, June, and July, as they then do the coaſt of Malabar; and in general this moonſon is accompanied with terrible ſtorms of thunder, lightning, torrents of rain, and violent SW. winds; while the northern parts of the iſland are in general dry and calm. But in October and November, when the oppoſite moonſon ſets in on the coaſt of Coromandel, the northern parts of Ceylon, has its ſhare, and the ſouthern are little affected. Though theſe monſoons give little diſturbance to the interior of Ceylon, it has its own periodical ſeaſon, March and April, when the rain, thunder and lightning are dreadful. As in other places near the equator, in this iſland the days and nights vary little in length: during the two ſeaſons the difference is only about 15 minutes. The ſeaſons are more regulated by the monſoons than the courſe of the ſun; for although the iſland lies N. of the line, the cooleſt ſeaſon is during the ſummer ſolſtice, while the weſtern monſoon prevails. In October their ſpring begins, and from January to a April, they have their warmeſt weather. During the day, the heat is nearly the ſame all the year; but from the dampneſs of the earth, and the prevalence of the winds during the monſoons, the nights are much cooler at that ſeaſon. Upon the whole, though the climate is far more temperate than on the continent of India, the temperature is chiefly confined to the ſea coaſt, for in the interior of the country, among thick woods, and lofty hills, the heat is much greater, and the climate often very ſultry and unwholeſome. The ſoil of this iſland is in general ſandy, with a ſmall mixture of clay; but in the SW. parts, near Columbo the ground is generally marſhy, rich, and fruitful. Among the vegetable productions of Ceylon, the cinnamon is the moſt valuable, and what may be reckoned the ſtaple commodity of the iſland. It grows moſt abundantly in the neighbourhood of Columbo, where the principal woods or cinnamon gardens are. Among theſe, the grand garden, which is neareſt the town, occupies a a tract of country from 10 to 15 miles in length, extending from the NE. to the S. of the diſtrict. Here nature ſeems to have concentrated both the riches and the beauty of the iſland. Over the plain, covered with low cinnamon trees, the eye reaches the groves evergreens, interſperſed with tall clumps, and bounded every where with ranges of cocoa-nut, and other trees; ſuch as the uphorbium, tulip tree, ebony, red wood, caſſia, cotton, lime, mangoe, citron, coffee; and the trees producing balſam of capivi, gum, gamboge, lac, &c. &c. Here is alſo the black and yellow TEAK, the wood of which is of a moſt beautiful grain, but ſo hard that the cutting of it proves very deſtructive to the carpenters tools. But the moſt remarkable tree in this iſland is the *tallipot*, one of whoſe leaves will cover ten men, and keep them from rain. They are very light, and travellers carry them from place to place, and uſe them inſtead of tents. The common flowering ſhrubs, which are numerous, ſend forth a moſt agreeable fragrance every morning and evening. The fineſt fruits grow in vaſt plenty; but there is alſo a poiſonous fruit, called ADAM'S APPLE, which in ſhape reſembles the quarter of an apple cut out with the two inſides a little convex, and a continued ridge along the outer edges; and is of a beautiful orange colour. Pepper, ginger, and cardamoms, are alſo produced in Ceylon; with 5 kinds of rice, which ripen one after another. It alſo abounds with topazes, garnets, rubies, and other precious ſtones; beſides ores of copper, iron, &c. and veins of black cryſtal. Common deer as well as Guinea deer, are numerous; but the horned cattle are both very ſmall and ſcarce, ſix of them weighing altogether, only 714 pounds, and one of theſe only 70 lb. Yet the iſland produces the largeſt and beſt elephants in the world; but the woods are infeſted by tigers, the moſt terrible of all ravenous beaſts. They abound alſo with ſnakes of a monſtrous ſize, one of which has been known to deſtroy a tiger, and devour him at one meal. Mr Ives ſaw one 15 feet long and 30 inches in circumference. Spiders, centipedes, and ſcorpions alſo grow to an enormous ſize. Our author ſaw a ſpider as large as a toad, with brown hair upon it, and legs as thick as the ſhank of a tobacco pipe. A ſcorpion taken out of a piece of wood, was 8 inches long, from head to tail, excluſive of the claws; the ſhell was as hard as that of a crab: and Mr Ives killed a centipede more than 7 inches long. Here the MANTIS or *creeping leaf* is met with; which is ſuppoſed to be a ſpecies of graſshopper, having every member of common inſects, though in ſhape and appearance it greatly reſembles a leaf. It is of a green colour. The ſea coaſts abound with fiſh; and the pearl fiſhery, in the bay of Condatchy, during the ſeaſon, exhibits one of the moſt intereſting ſcenes in Ceylon. The conqueſt of this iſland was the firſt attempt of Albuquerque the Portugueſe admiral. He found it well peopled, and inhabited by two different nations, the *Bedas* inhabiting the northern, and the CINGLASSES who dwelt in the ſouthern parts. The former were very barbarous, but the latter a good deal more poliſhed. Beſides the advantages which theſe people derived from their mines of precious ſtones, they carried on the greateſt pearl fiſhery in the Eaſt. Theſe nations the Portugueſe conquered, and tyrannized over in ſuch a manner, that they aſſiſted the Dutch in expelling them from the iſland; and by their united efforts this was accompliſhed in 1658, after a bloody and obſtinate war. All the Portugueſe ſettlements fell into the hands of the Dutch Eaſt India company, excepting a ſmall diſtrict on the eaſtern coaſt without any port, from whence the ſovereign of the country had his ſalt. Theſe ſettlements formed a regular tract, extending from 2 to 12 leagues into the iſland. The Company appropriated all the productions of the iſland. Their articles of trade were, 1. Amethyſts, ſapphires, topazes, and rubies; the laſt very ſmall and very indifferent. The Moors from the coaſt of Coromandel uſed to buy them, paying a moderate tax: and when cut, ſold them at a low price in the different countries of India. 2. Pepper, coffee, and cardamom, all of an inferior quality. 3. Handkerchiefs, pagnes, and ginghams, of a fine red colour, fabricated by the Malabars at Jafnapatam. 4. Ivory, and elephants, which were carried to the coaſt of Coromandel. 5. Areca, which the company bought at about 8s. 9d. the ammonan, and ſold on the ſpot at L. 1. 12s. to the merchants of Bengal, Coromandel, and the Maldives; who, in return, gave rice, coarſe linen, and cowries. 6. The pearl fiſhery, which was formerly of great conſequence, but of late brought in only about L.8,750 *per annum*. 7. The great object of the company was cinnamon. They purchaſed the greateſt part of their cinnamon of their Indian ſubjects, and, all expences deducted, it did not coſt them above 6d per pound. The annual expences of the colony were about L.96,250; their revenues, &c. produced only about L.87,500. This deficiency was ſupplied out of the profits of the cinnamon trade; and they were obliged to provide for the expences of the wars in which they were frequently engaged with the king of Candy, the ſovereign of the iſland. Theſe were very detrimental to the intereſts of the Dutch; for which reaſon they endeavoured to engage the good will of this monarch by ſhowing him all imaginable civilities. The harmony, however, was often interrupted. In a bloody war, which terminated 14th Feb. 1766, the Ceyloneſe monarch was driven from his capital, and the Dutch made a very advantageous treaty. Their ſovereignty was acknowledged over all that part of the country they poſſeſſed before the war, and that part of the coaſts held by the natives was ceded to them. They were allowed to gather cinnamon in all the plains; and the court was to ſell them the beſt ſort produced in the mountains, at L.1:16:1 for 18lb. The king engaged to have no connection with any foreign power; and even to deliver up any Europeans who might happen to ſtray into the iſland. In return for ſo many conceſſions, he was to receive annually the value of the produce of the ceded coaſts; and from thence his ſubjects were to be furniſhed gratis with as much ſalt as they had occaſion for. The Dutch kept poſſeſſion of the whole Portugueſe ſettlements in the iſland, except a ſmall diſtrict on the E. coaſt, and carried on an advantageous commerce with the merchants of Bengal, Coromandel, &c. till the 16th Feb. 1796, when the whole of the Dutch poſſeſſions on this iſland were ſurrendered to the Britiſh and E. India Company's troops, under captain Gardner and colonel Stuart; and was confirmed to them by the treaty of Amiens. Lon. from 80° to 82° E. Lat. from 6° to 10° N.

CEYLONESE, the inhabitants of Ceylon. The aborigenes of Ceylon conſiſt of two claſſes of people, the Cingaleſe and the Vaddhs. The latter are ſtill in the rudeſt ſtage of ſocial life; they live emboſomed in the woods, or in the hollows of the mountains; hunting their ſole employment; and providing for the day their only care. Some of them acknowledge the authority of the king of Candy, and exchange with the Cingaleſe elephants teeth, and deer's fleſh, for arrows, cloths, &c.; but this traffick is not general; for two-thirds of them hold no communication with the Cingaleſe, and have an utter antipathy to ſtrangers. They worſhip a particular god, and their religious doctrine ſeems to conſiſt of ſome indiſtinct notions of the fundamental principles of the Braminical faith. In ſome places, they have erected temples; but for the moſt part they perform their worſhip at an altar conſtructed of bamboos, under the ſhade of a banyan tree. The Cingaleſe are the ſubjects of the king of Candy, and appear to have been, from time immemorial, a race of Hindoos, inſtructed in all the arts of civil life, nearly in as high a degree as the nations of the neighbouring continent. They are a quiet inoffenſive people; very grave, temperate, and frugal. Their bodies partake of the eaſe of their minds, and it is with reluctance they are rouſed to any active exertion. When, however, neceſſity obliges them to apply to any work, ſuch as cultivating the land, they can undergo a great deal of labour. They uſe boats, hollowed out of the trunks of trees, about 12 or 14 feet long, but only as many inches broad within. The tree part in the bottom is much larger; but when the boat on account of the ſize of the tree, is too ſmall, they make a trough on the top of it ſquare at both ends. Some boats, however, are much larger, being built between two trees; and with theſe they coaſt along the ſhore; the others are for fiſhermen. They are Pagans; and though they acknowledge a ſupreme God, they worſhip none but the inferior ſort, among whom they reckon the ſun and moon. In their temples are images, well executed, though their figures are monſtrous; ſome are of ſilver, copper, &c. The different gods have various prieſts, who have all ſome privileges. The houſes are ſmall and low, with walls made of hurdles, ſmoothly covered with clay, and roofs thatched. They have no chimnies, and their furniture is only a few earthen veſſels, with two copper baſons, and 2 or 3 ſtools; none but the king being allowed to ſit in a chair. Even the moſt affluent have no other clothes but coarſe linen wrapt about them. Their food is generally rice and ſalt, and their common drink water, which they pour into their mouths out of a veſſel like a tea-pot, through the ſpout, never touching it with their lips.

CLYX, king of Thrace. See ALCYONE.

* C FAUT. A note in the ſcale of muſick.—

Gamut I am, the ground of all accord,
A re, to plead Hortenſio's paſſion;
B mi Bianca, take him for thy lord.
C faut, that loves with all affection. *Shakeſp.*

* CH has, in words purely Engliſh, or fully naturalized, the ſound of *tſh*; a peculiar pronunciation, which it is hard to deſcribe in words. In ſome words derived from the French, it has the ſound of *ſh*, as *chaiſe*; and, in ſome derived from the Greek, the ſound of *k*, as *cholerick*.

CHA, a thin light ſilk made in China.

CHAA, the Chineſe name for TEA.

CHABAQUIDICK, a ſmall fertile iſland of the State of Maſſachuſetts, 3 miles long, and 1½ broad; ſituated E. of Martha's Vineyard.

CHABLAIS, a diſtrict of France, being the N. part of the department of Mont Blanc, and a ci-devant province of Savoy; when it was bounded on the E. by Vallais; on the S. by Faucigny; and on the W. and N. by the republic and lake of Geneva.

CHABLIS, a town of France, in the department of Yonne, and ci-devant province of Burgundy, remarkable for white wines. It is 15 miles from Auxerre. Lon. 3. 59. E. Lat. 47. 42. N.

CHABNAM, a very fine kind of muſlin, made of cotton in Bengal.

CHABORAS, a river of Aſiatic Turkey, which runs into the Euphrates.

CHACAPOYAS, a diſtrict of Peru, within the Cordilleras. The native Indians make a great varitey of cottons and tapeſtry, equally beautiful in their colours, and neat in their workmanſhip.

* CHACE. See CHASE.

CHACEWATER, a village of England, in Cornwall 5 miles W. of Truro. In its environs, within the circle of two miles, are ſeveral rich copper mines.

To CHACK. See *To* BEAT, § 11.

CHACKENDON, a town near Woodcot, Oxford.

CHACKSHIRES, a kind of long breeches or trouſers, worn by the Turks. *Aſh*

CHACKTAWS, a powerful nation of American Indians, who reſide in the weſtern parts of Georgia. Their territory has the river Tombeckbee, or Mobile, on the E. Weſt Florida on the S. the Miſſiſippi on the W. and the territory of the Chickaſaws on the N. They are ſaid to be about 6000 in number; and more civilized than any other nation of American Indians, within the territories of the United States. They not only ſing, dance, and compoſe poetry, but are virtuous, ſenſible, and ingenious; in war courageous and intrepid, although their natural diſpoſition is gentle and quiet; and, what is ſtill more deciſive of their civilization, is, that they uſe their women with great tenderneſs. They are called FLAT HEADS, from a peculiar cuſtom they have of flattening the foreheads of their male children. When a boy is born, the nurſe procures a wooden caſe, which ſerves the purpoſe of a cradle. The part, wherein the child's head is laid, is hollowed out in the form of a brick mould. The child is laid proſtrate on his back, and a bag of ſand put upon his face, which gently compreſſes the forehead, and forms it ſomewhat reſembling a brick, from the eye brows upwards. Their foreheads of conſequence are high, and incline backwards. They alſo celebrate *the feaſt of the dead* with great ſolemnity. See **Americans**, § 9.

CHACKTOOLE BAY, a bay in Norton Sound, on the W. coaſt of N. America, diſcovered by Captain Cook, in 1778. It is expoſed to S. and SW winds. Lon. 162. 47. W. Lat. 64. 31. N.

CHACO, a large country of South America, ſituated between 19° and 37° Lat. S. It belongs to the Spaniards, by whom it was conquered in 1536. It is not naturally fruitful; but abounds in gold mines, which are ſo much the more valuable that they are eaſily worked. The works are carried on by about 800 negroes, who deliver every day to their maſters a certain quantity of gold; and what they can collect above this, belongs to themſelves; as well as what they find on thoſe days that are conſecrated to religion and reſt, upon condition that on theſe occaſions they maintain themſelves. This enables many of them to purchaſe their liberty; after which they intermarry with the Spaniards.

CHACONE, or CHACOON, a Spaniſh dance, originally from the Moors; the meaſure of which is always in triple time.

* CHAD. *n. ſ.* A ſort of fiſh.—Of round fiſh there are brit, ſprat, whiting, *chad*, eels, congar, millet. *Carew's Survey of Cornwal.*

CHADBURY, a town near Holt, Dorſetſhire.

CHAD-CHAPEL, near Malpas, Cheſhire.

CHADCHOD, in Jewiſh antiquity, is mentioned by Ezekiel, among the merchandizes which were brought to Tyre. The old interpreters, not well knowing the meaning of this term, continued it in their tranſlation. St Jerom acknowledges that he could not diſcover the interpretation of it. The Chaldee interprets it *pearls;* others think that the onyx, ruby, carbuncle, cryſtal, or diamond is meant by it.

CHADDENSDEN, a village 1 m. from Derby.

CHADDESLEY, a town in Worceſterſhire.

CHADFIELD, near Bradfield, Wilts.

CHADLEWORTH, SE. of Fawley, Berkſh.

CHADLINGTON, near Norton, Oxfordſh.

CHADSON, near Aſhby, Northamptonſh.

CHADSHUNT, near Kington, Warwickſh.

CHADWELL, near Rumford, in Eſſex.

CHADWICK, two villages; 1. near Bomſgrove, Worceſterſh. 2. in Hampton pariſh, Warwickſh.

CHÆRONEA, in ancient geography, the laſt town, or rather village, of Bœotia, towards Phocis; the birthplace of Plutarch: famous for the fatal defeat of the confederate Greeks by Philip of Macedon; (ſee **Philip**;) as well as for that of Mithridates by the Romans, wherein the former loſt 110,000 men.

CHÆRONENSIS, a native of Chæronea.

CHÆROPHYLLUM, **Chervil**: A genus of the digynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 45th order, *Umbellatæ*. The involucrum is reflexed concave, the petals inflexed-cordate; the fruit oblong and ſmooth. There are 7 ſpecies, two of which, called *cow-weed* and *wild-chervil*, are weeds common in many places of Britain. The roots of the firſt have been found poiſonous when uſed as parſnips: the rundles afford an indifferent yellow dye; the leaves and ſtalks a beautiful green. Its preſence indicates a fertile ſoil, but it ought to be rooted out from all paſtures early in the ſpring, as no animal but the aſs will eat it. It is one of the moſt early plants in ſhooting, ſo that by the beginning of April the leaves are near two feet high. The leaves are recommended by Geoffroy, as aperient and diuretic, and at the ſame time grateful to the palate and ſtomach. He even aſſerts, that dropſies which do not yield to this medicine can ſcarcely be cured by any other. He directs the juice to be given in the doſe of 3 or 4 ounces every 4th hour, and continued for ſome time either alone, or in conjunction with nitre and ſyrup of the 5 opening roots. The other ſpecies of chærophyllum are not poſſeſſed of any remarkable property.

CHÆTIA, in zoology, a ſpecies of inſects of the *aptera* kind, without any viſible limbs. It reſembles a hair, or a piece of fine thread; its ſurface is ſmooth, its body round, and very ſlender. It is called in Engliſh the HAIR-WORM.

CHÆTODON, in ichthyology, a genus of fiſhes belonging to the order of thoraci. The teeth are very numerous, thick, ſetaceous, and flexile; the rays of the gills are ſix. The back fin and the fin at the anus are fleſhy and ſquamous. There are 23 ſpecies, diſtinguiſhed from each other principally by the figure of the tail, and the number of ſpines in the back-fin. The moſt remarkable is the.

Chætodon rostratus, or ſhooting fiſh, having a hollow, cylindrical beak. It is a native of the Eaſt Indies, where it frequents the ſides of the ſea and rivers in ſearch of food, from its ſingular manner of obtaining which it receives its name. When it ſpies a fly ſitting on the plants that grow in ſhallow water, it ſwims on to the diſtance of 4, 5, or 6 feet; and then, with a ſurpriſing dexterity, it ejects out of its tubular mouth a ſingle drop of water, which never fails ſtriking the fly into the water, where it ſoon becomes its prey.

CHAFCOMB, a town near Chard, Somerſetſh.

* CHAFE. *n. ſ.* [from the verb.] A heat; a rage; a fury; a paſſion; a fume; a pett; a fret; a ſtorm.—When Sir Thomas More was ſpeaker of the parliament, with his wiſdom and eloquence he ſo croſſed a purpoſe of cardinal Wolſey's, that the cardinal in a *chafe*, ſent for him to White hall. *Camden's Remains.*—

At this the knight grew high in *chafe*,
And ſtaring furiouſly on Ralph,
He trembled. *Hudibras.*

(1.) * *To* **Chafe.** *v. a.* [*echauffer*, Fr.] 1. To warm with rubbing.—They laid him upon ſome of their garments, and fell to rub and *chafe* him, till they brought him to recover both breath, the ſervant, and warmth, the companion of living. *Sidney.* 2. To heat by rage or hurry.—

Have I not heard the ſea, puff'd up with winds,
Rage like an angry boar, *chafed* with ſweat?
Shakeſpeare.

3. To perfume.—

Lilies more white than ſnow,
New fall'n from heav'n, with violets mix'd, did grow;

Whoſe ſcent ſo *chaf'd* the neighbour air, that you
Would ſurely ſwear Arabick ſpices grew.
Suckling.

4. To make angry; to inflame paſſion.—For all that he was inwardly *chafed* with the heat of youth and indignation, againſt his own people as well as the Rhodians, he moderated himſelf betwixt his own rage, and the offence of his ſoldiers. *Knolles's Hiſtory.*

This *chaf'd* the boar, his noſtrils flames expire,
And his red eye-balls roll with living fire. *Dryd.*

(2.) * *To* Chafe. *v. n.* 1. To rage; to fret; to fume; to rave; to boil.—

How did they fume, and ſtamp, and roar, and *chafe*,
And ſwear! not Addiſon himſelf was ſafe. *Pope.*

2. To fret againſt any thing.—

The murmuring ſurge,
That on th' unnumber'd idle pebble *chafes*,
Cannot be heard ſo high. *Shak. King Lear.*

(1.) * CHAFER. *n. ſ.* [*ceaſon*, Sax. *kever*, Dutch.] An inſect; a ſort of yellow beetle.

(2.) Chafer. See Scarabæus.

(1.) * CHAFERY. *n. ſ.* A forge in an iron mill, where the iron is wrought into complete bars, and brought to perfection. *Philips.*

(2.) Chafery, in the iron works, is the name of one of the two principal forges. The other is called the FINERY. When the iron has been brought at the finery into what is called an ANCONY, or ſquare maſs, hammered into a bar in its middle, but with its two ends rough, the buſineſs to be done at the chafery is the reducing the whole to the ſame ſhape, by hammering down theſe rough ends to the ſhape of the middle part.

* CHAFE-WAX. *n. ſ.* An officer belonging to the lord chancellor, who fits the wax for the ſealing of writs. *Harris.*

* CHAFF. *n. ſ.* [*ceaſ*, Sax. *kaf*, Dutch.] 1. The huſks of corn that are ſeparated by threſhing and winnowing.—He ſet before him a ſack of wheat, as it had been juſt threſhing out of the ſheaf; he then bid him pick out the *chaff* from among the corn, and lay it aſide by itſelf. *Spectator.* 2. It is uſed for any thing worthleſs.

Chaff-cutter, a machine for making chaff to feed horſes.—The advantages of an eaſy and expeditious method of cutting ſtraw into chaff, by an engine which could be uſed by common labourers have occaſioned various attempts to bring ſuch an engine to perfection. An invention of Mr James Pike, watchmaker of Newton Abbot in Devonſhire, which is of a ſimple and cheap conſtruction, ſeems to anſwer every purpoſe. This engine is fixed on a wooden frame, which is ſupported with 4 legs, and on this frame is a box for containing the ſtraw, 4 feet 6 inches long, and about 10 inches broad. At one end is fixed acroſs the box two rollers inlaid with iron, in a diagonal line about $\frac{1}{8}$ of an inch above the ſurface; on the end of theſe rollers are fixed two ſtrong braſs wheels, which takes one into the other. On one of theſe wheels is a contract wheel, whoſe teeth take in a worm on a large arbour; on the end of this arbour is fixed a wooden wheel, 2 feet 5 inches diameter and 3 inches thick; on the inſide of this wheel is fixed a knife, and every revolution of the wheel the knife paſſes before the end of the box and cuts the chaff, which is brought forward between the rollers, which are about $2\frac{1}{2}$ inches aſunder. The ſtraw is brought on by the worm taking one tooth of the wheel every round of the knife; and being ſo hard preſſed between the rollers, the knife cuts off the chaff with ſo great eaſe, that 22 buſhels can be cut within the hour, and makes no more noiſe than is cauſed by the knife paſſing through the chaff. In *Plate* LXV. *Fig.* 1, *A* repreſents the box into which the ſtraw is put: *B*, the upper roller, with its diagonal projecting ribs of iron, the whole moving by the revolution of the braſs wheel *C*, on the axis of which it is fixed. *D*, a braſs wheel, having upon it a face wheel, whoſe teeth take into the endleſs ſcrew on the arbor *E*, while the teeth on the edge of this wheel enter between thoſe on the edge of the wheel *C*. On the axis of the wheel *D* is a roller, with iron ribs ſimilar to *B*, but hid within the box. *E*, the arbor, one of the ends of which being made ſquare, and paſſing through a mortiſe in the centre of the wooden wheel *F*, is faſtened by a ſtrong ſcrew and nut; the other end of this arbor moves round in a hole within the wooden block *G*. *H*, the knife, made faſt by ſcrews to the wooden wheel *F*, and kept at the diſtance of nearly $\frac{1}{4}$ of an inch from it, by means of the blade, and reaching to within an inch of the edge. *I*, the handle, mortiſed into the outſide of the wooden wheel *F*.

(1.) * *To* Chaffer. *v. a.* [The active ſenſe is obſolete.] 1. To buy.—

He *chaffer'd* chairs in which churchmen were ſet,
And breach of laws to privy farms did let. *Spenſ.*

2. To exchange.—

Approaching nigh, he never ſtaid to greet,
Ne *chaffer* words, proud courage to provoke.
Fairy Queen.

(2.) * *To* Chaffer. *v. n.* [*kauffen*, German, to buy.] To treat about a bargain; to haggle; to bargain.—In diſputes with chairmen, when your maſter ſends you to *chaffer* with them, take pity, and tell your maſter that they will not take a farthing leſs. *Swift.*

CHAFFERCONNERS, or } in commerce,
CHAFFERCOUNCES, } printed linens
manufactured in the Great Mogul's dominions, and imported by the way of Surat.

* CHAFFERER. *n. ſ.* [from *chaffer*.] A buyer; bargainer; purchaſer.

* CHAFFERY. *n. ſ.* [from *eſchauffer*, Fr. to heat.] A veſſel for heating water. *Dict.*

(1.) * CHAFFERY. *n. ſ.* [from *chaffer*.] Traffick; the practice of buying and ſelling.—The third is, merchandiſe and *chaffery*, that is, buying and ſelling. *Spenſer's State of Ireland.*

(2.) Chaffery. See Chafery, § 1 and 2.

(1.) * CHAFFINCH. *n. ſ.* [from *chaff* and *finch*.] A bird ſo called, becauſe it delights in chaff, and is by ſome much admired for its ſong. *Philips.*

(2.) Chaffinch. See Fringilla.

* CHAFFLESS. *adj.* [from *chaff*.] Without chaff.—

The love I bear him,
Made me to fan you thus; but the gods made you,
Unlike all others, *chaffleſs*. *Shak. Cymbeline.*

CHAFFORD, a town near Tunbridge, Kent

(1.) * CHAFF-

Plate LXV.

Fig. 8.
Chermes various.

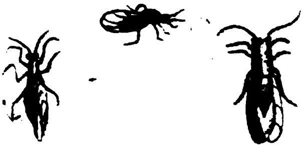
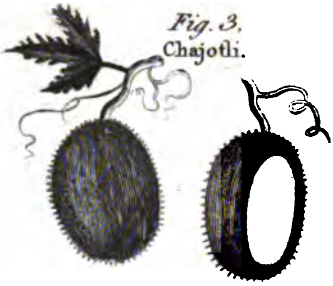


Fig. 3.
Chajotli.



Lamp Chronometer. *Fig. 18.*

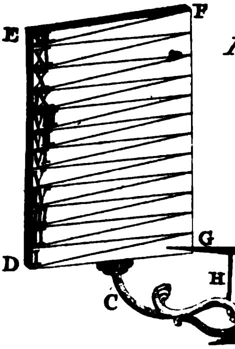


Fig. 16.

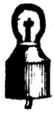
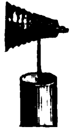


Fig. 17.



Chiton.

Fig. 10.

Fig. 11.

Fig. 12.

Fig. 13.

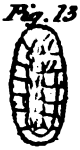
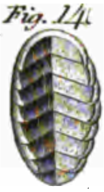


Fig. 14.



Chama.

Fig. 5.

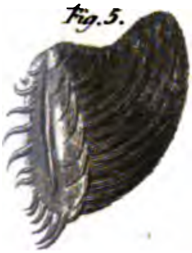


Fig. 6.

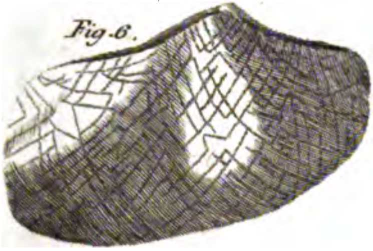


Fig. 7.
Characters used in Medicine & Pharmacy.

℞ *Recipe, Take*

gr. i *A Grain.*

℈i *A Scruple.*

ʒi *A Dram.*

℥i *An Ounce.*

℔i *A Pound or Pint.*

dwt.i *A Pennyweight.*

M. *Misce ie. mix them.*

Fig. 9.
Cheval de Frise.

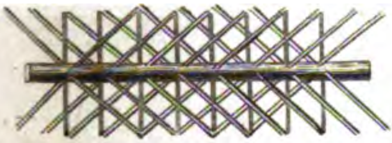


Fig. 4.

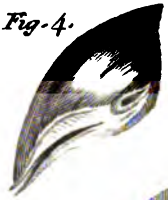


Fig. 1.
Chaff Cutter.

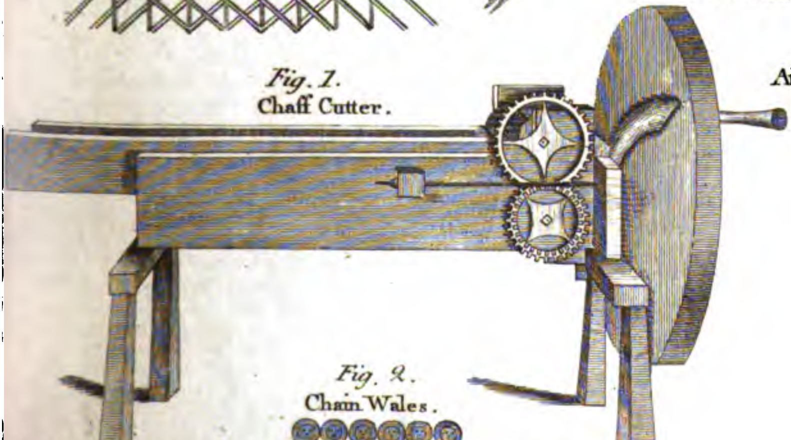


Fig. 2.
Chain Wales.

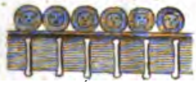
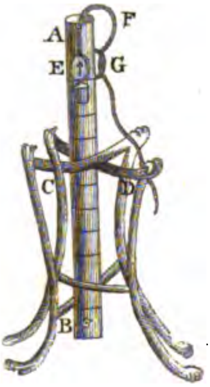


Fig. 15.
Air Chronometer.



(1.) * **CHAFFWEED.** *n. ſ.* [*gnaphalium*, Lat.] An herb; the ſame with *cud-weed;* which ſee.

(2.) **Chaffweed.** See Gnaphalium.

* **CHAFFY.** *adj.* [from *chaff.*] Like chaff; full of chaff; light.—If the ſtraws be light and *chaffy*, and held at a reaſonable diſtance, they will not riſe unto the middle. *Brown.*

* **CHAFINGDISH.** *n. ſ.* [from *chafe* and *diſh.*]. A veſſel to make any thing hot in; a portable grate for coals.—Make proof of the incorporation of ſilver and tin in equal quantities, whether it will endure the ordinary fire which belongeth to *chafingdiſhes*, poſnets, and ſuch other ſilver veſſels. *Bacon's Phyſical Remains.*

CHAGAING, a city of Birmah, with a ſmall fort. It is the principal emporium for cotton, which is brought from all parts of the country, and embarked here for the Chineſe market. Here alſo is the only manufacture of marble idols, whence the whole Birman empire is ſupplied: none being allowed to be made in any other place. The quarries where the materials are got are only a few miles diſtant.' It is ſituated oppoſite Ava, the deſerted capital, on the N. ſide of the Irawaddy, which here runs N. and parts it from Ummerapour, the preſent capital.

(1.) **CHAGFORD**, a town near Tunbridge, Kent.

(2.) **Chagford**, near Dartmore, Devonſhire.

(1.) **CHAGRE**, a river of S. America, in the province of Darien.

(2.) **Chagre**, a fort at the mouth of the river, N° 1. It has been taken ſeveral times by the buccaneers, and laſt of all by Admiral Vernon in 1740. It lies a little SW. of Porto-Bello. Lon. 80. 7. W. Lat. 9. 20. N.

* **CHAGRIN.** *n. ſ.* [*chagrine*, Fr.] Ill humour; vexation; fretfulneſs; peeviſhneſs. It is pronounced *ſhagreen.*—I grieve with the old, for ſo many additional inconveniencies and *chagrins*, more than their ſmall remain of life ſeemed deſtined to undergo. *Pope's Letters.*

* *To* **Chagrin.** *v. a.* [*chagriner*, Fr.] To vex; to put out of temper; to teaze; to make uneaſy.

(1.) * **CHAIN.** *n. ſ.* [*chaine*, Fr.] 1. A ſeries of links faſtened one within another.—And Pharaoh took off his ring, and put it upon Joſeph's hand, and put a gold *chain* upon his neck. *Gen.* xli. 42. 2. A bond; a manacle; a fetter; ſomething with which priſoners are bound.—

> Still in conſtraint your ſuff'ring ſex remains,
> Or bound in formal, or in real *chains.* *Pope.*

3. A line of links with which land is meaſured.—A ſurveyor may as ſoon, with his *chain*, meaſure out infinite ſpace, as a philoſopher, by the quickeſt flight of mind, reach it, or, by thinking, comprehend it. *Locke.* 4. A ſeries linked together; as, of cauſes, or thoughts; a ſucceſſion; a ſubordination.—Thoſe ſo miſtake the Chriſtian religion, as to think it is only a *chain* of fatal decrees, to deny all liberty of man's choice toward good or evil. *Hammond.*

(2.) **Chain** alſo denotes a kind of ſtring, of twiſted wire; ſerving to hang watches, tweezer-caſes, and other valuable toys upon. The invention of this is aſcribed to the Engliſh; whence, in foreign countries, it is denominated the *Engliſh chain*. Theſe chains are uſually either of gold, ſilver, or gilt copper; the thread or wire of each kind is very fine. In making theſe chains, a part of the wire is folded into little links of an oval form; the longeſt diameter about 3 lines; the ſhorteſt, one. Theſe, after they have been exactly ſoldered, are again folded in two; and then interwoven, by ſeveral other threads of the ſame thickneſs; ſome whereof, which paſs from one end to the other, imitate the warp of a ſtuff; and the others, which paſs tranſverſe, the woof. There are at leaſt 4000 little links in a chain of four pendants; which are bound ſo equally, and firmly together, that the whole ſeems to conſiſt of one entire piece. Of late years, however, the manufacture of this kind of chains, has been almoſt entirely ſuperſeded by that of the poliſhed ſteel ones; which are much ſuperior in beauty, and are manufactured in great variety of patterns and at all prices, at Birmingham, Woodſtock, &c.

(3.) **Chain**, in ſurveying, a meaſure, conſiſting of a certain number of links of iron wire, uſually 100, ſerving to take the dimenſions of fields, &c. This is what Merſenne takes to be the arvipendium of the ancients. The chain is of various dimenſions, as the length or number of links varies: that commonly uſed in meaſuring land, called Gunter's chain, is in length 4 poles or perches; or 22 yards; or 66 feet or 100 links; each link being 7 inches $\frac{22}{25}$. This chain is peculiarly adapted to land meaſuring in England, as 10 ſquare chains make exactly an Engliſh acre. Its chief convenience is in finding readily the numbers contained in a given field. Where the proportion of ſquare feet and acres differ, the chain, to have the ſame advantages as Gunter's chain, muſt alſo be varied. Thus in Scotland, the chain ought to be of 74 feet, or 24 Scotch ells, if no regard be had to the difference between the Scotch and Engliſh foot; but if regard be had to this difference, the Scotch chain ought to conſiſt of $74\frac{2}{5}$ Engliſh feet, or 74 feet 4 inches and $\frac{4}{5}$ of an inch. This chain being divided into 100 links, each of theſe will be $8\frac{1}{2}$ $\frac{6}{5}$ inches. That ordinarily uſed for large diſtances, is in length 100 feet; each link one foot. For ſmall parcels, as gardens, &c. is ſometimes uſed a ſmall chain of one pole or $16\frac{1}{2}$ feet length; each link one inch $\frac{48}{50}$. Some inſtead of chains uſe ropes; but theſe are liable to ſeveral irregularities; from the different degrees of moiſture, and of the force which ſtretches them. Schwenterus, in his Practical Geometry, tells us, he has obſerved a rope 16 feet long, reduced to fifteen, in an hour's time, by the mere falling of a hoar froſt. To obviate theſe inconveniences, Wolfius directs, that the little ſtrands whereof the rope conſiſts be twiſted contrary ways, and the rope dipped in boiling hot oil; and when dry, drawn through melted wax. A rope thus prepared, will neither gain nor loſe any thing in length, even though kept under water all day.

(4.) **Chain** is alſo a meaſure uſed in France, for wood, corn, hay, &c.

(5.) **Chains** are made of various matters, and ſizes and for divers uſes.—Ports, rivers, &c. are cloſed with iron chains: The arms of the ci-devant kingdom of Navarre were, *Chains, Or, in a field, Gules.* The kings of Spain had leagued againſt the Moors; and having gained a great victory over them, in 1212, the magnificent tent of Miralmumin was given to the king of Navarre, he being the firſt who broke and forced the chains thereof.

(6.) Chains, in ſhip-building, are ſtrong links or plates of iron, the lower ends of which are bolted through the ſhip's ſide to the timber.

(7.) Chains, Gold, are among the badges of dignity of the chief magiſtrates of a city, as the lord mayor of London, the lord provoſt and bailies of Edinburgh, &c.—Something like this obtained among the ancient Gauls: the principal ornament of thoſe in power and authority was a gold chain, which they wore on all occaſions; and even in battle to diſtinguiſh them from the common ſoldiers.

(8.) Chains, hanging in, a kind of puniſhment inflicted on murderers. By ſtat. 25. Geo. II. c. 37. the judge ſhall direct ſuch to be executed on the next day but one, unleſs Sunday intervene; and their bodies to be delivered to the ſurgeons to be diſſected and anatomized: and he may direct them afterwards to be hung in chains. This puniſhment has not been uſed for many years paſt in Scotland.

* *To* Chain. *v. a.* [from the noun.] 1. To faſten or bind with a chain.—They repeal daily any wholeſome act eſtabliſhed againſt the rich, and provide more piercing ſtatutes daily to *chain* up and reſtrain the poor. *Shakeſp.*—The mariners he *chained* in his own galleys for ſlaves. *Knolles.* 2. To enſlave; to keep in ſlavery.—

The monarch was ador'd, the people *chain'd.*
Prior.

3. To put on a chain.—The admiral ſeeing the mouth of the haven *chained*, and the caſtles full of ordnance, and ſtrongly manned, durſt not attempt to enter. *Knolles's Hiſt. of the Turks.* 4. To unite.

O Warwick, I do bend my knee with thine,
And in this vow do *chain* my ſoul with thine.
Shakeſpeare.

CHAIN-ISLAND, an iſland diſcovered by Captain Wallis in the South ſea. It ſeemed to be about 5 miles long and as much broad, lying in the direction of NW. and SE. It appeared to be a double range of woody iſlands joined together by reefs, ſo as to compoſe one iſland of an oval figure, with a lake in the middle. The trees are large; and from the ſmoke that iſſued from the woods, it appeared to be inhabited. Lon. 145. 54. W. Lat. 17. 23. S.

* CHAINPUMP. *n. ſ.* [from *chain* and *pump.*] A pump uſed in large Engliſh veſſels, which is double, ſo that one riſes as the other falls. It yields a great quantity of water, works eaſily, and is eaſily mended, but takes up a great deal of room, and makes a diſagreeable noiſe. *Chambers.*

(1.) * CHAINSHOT. *n. ſ.* [from *chain* and *ſhot.*] Two bullets or half bullets, faſtened together by a chain, which, when they fly open, cut away whatever is before them.—In ſea fights oftentimes, a buttock, the brawn of the thigh, and the calf of the leg, are torn off by the *chainſhot*, and ſplinters. *Wiſeman's Surgery.*

(2.) Chain-shot are uſed at ſea to ſhoot down yards or maſts, and to cut the ſhrouds or rigging of a ſhip.

Chain, Top, on board a ſhip, a chain to ſling the ſail yards in time of battle, to prevent them from falling down, when the ropes, by which they are hung, happen to be ſhot away, or rendered incapable of ſervice.

Chain-wales, or Channels, of a ſhip, [*porte-hoiſſoirs,*] are broad and thick planks projecting horizontally from the ſhip's outſide, abreaſt of and ſomewhat behind the maſts. They are formed to extend the ſhrouds from each other, and from the middle line of the ſhip, ſo as to give a greater ſupport to the maſts, as well as to prevent the ſhrouds from damaging the gunwale, or being hurt by rubbing againſt it. Every maſt has its chain-wales, which are either built above or below the ſecond deck ports in a ſhip of the line: they are ſtrongly connected to the ſide by knees, bolts, and ſtandards, beſides being confined thereto by the chains whoſe upper ends paſs through notches on the outer edge of the chain-wales, ſo as to unite with the ſhrouds above. See *Plate* LXV, *fig.* 2.

* CHAINWORK. *n. ſ.* [from *chain* and *work.*] Work with open ſpaces like the links of a chain.—Nets of chequerwork, and wreaths of *chainwork*, for the chapiters which were upon the tops of the pillars. 1 *Kings.*

CHAJOTLI, or Chayoti, a Mexican fruit of a round ſhape, and ſimilar in the huſk with which it is covered to the cheſnut, but four or five times larger, and of a much deeper green colour. Its kernel is of a greeniſh white, and has a large white ſtone in the middle, like it in ſubſtance. It is boiled, and the ſtone eat with it. This fruit is produced by a twining perennial plant, the root of which is alſo good to eat. See *Plate* LXV. *fig.* 3.

(1.) * CHAIR. *n. ſ.* [*chair*, Fr.] 1. A moveable ſeat.—If a *chair* be defined a ſeat for a ſingle perſon, with a back belonging to it, then a ſtool is a ſeat for a ſingle perſon, without a back. *Watt's Logick.* 2. A ſeat of juſtice, or of authority.—

The honour'd gods
Keep Rome in ſafety, and the *chairs* of juſtice
Supply with worthy men. *Shakeſp. Coriolanus.*

—The committee of the commons appointed Mr Pym to take the *chair. Clarendon.* 3. A vehicle born by men; a ſedan.—

Think what an equipage thou haſt in air,
And view with ſcorn two pages and a *chair. Pope.*

(2.) Chair, [*Cathedra,*] was anciently uſed for the pulpit. It is ſtill applied to the place whence profeſſors and regents in univerſities deliver their lectures, and teach the ſciences to their pupils.

(3.) Chair is alſo applied by the Romaniſts to certain feaſts, held anciently in commemoration of the tranſlation of the ſee, or ſeat of the vicarage of Chriſt, by St Peter.

(4.) Chair, Curule, was an ivory ſeat placed on a car, wherein were ſeated the prime magiſtrates of Rome, and thoſe to whom the honour of a triumph had been granted.

(5.) Chair, perforated, a chair, wherein the new elected pope is placed, F. Mabillon obſerves, is to be ſeen at Rome: but the origin thereof he does not attribute, as is commonly done, to the adventure of Pope Joan; but ſays there is a myſtery in it; and it is intended, forſooth, to explain to the pope thoſe words of ſcripture, that *God draws the poor from out the duſt and mire.*

(6.) Chair, Sedan, (§ 1. *def.* 3.) is ſupported by poles, and perſons are carried in it, by two men. There are 200 chairs allowed by act of parliament; and no perſon is obliged to pay for a hackney chair more than the rate allowed by the act for a hackney coach driven two third parts of the ſaid diſtance. 9 Ann. c. 23. § 8. Their number is ſince increaſed, by 10 Ann. c. 19. and 12 Geo. I. c. 12. to 400. See Hackney Coaches.

* CHAIRMAN. *n. ſ.* [from *chair* and *man*.] 1. The preſident of an aſſembly.—In aſſemblies generally one perſon is choſen *chairman* or moderator, to keep the ſeveral ſpeakers to the rules of order. *Watts.* 2. One whoſe trade it is to carry a chair.—

One elbows him, one juſtles in the ſhole,
A rafter breaks his head, or *chairman's* pole.
Dryden.

CHAIS DIEU, a town of France, in the department of Upper Loire, and ci-devant province of Velay. Its late Benedictine Abbey was much celebrated. It is 12 miles E. of Brioude. Lon. 3. 4. E. Lat. 45. 15. N.

(1.) * CHAISE. *n. ſ.* [*chaiſe*, Fr.] A carriage of pleaſure drawn by one horſe.—Inſtead of the chariot he might have ſaid the *chaiſe* of government; for a *chaiſe* is driven by the perſon that ſits in it. *Addiſon.*

(2.) Chaises, Post, are ſaid by Aurelius Victor, to have been firſt introduced by Trajan; but the invention is generally aſcribed to Auguſtus; and was probably only improved by Trajan and his ſucceſſors.

CHALASTICS, relaxing medicines.

CHALAZA, a white knotty ſtring at each end of an egg, formed of a plexus of the fibres of the membranes, whereby the yolk and white are connected together. See Egg.

CHALBURY, a town in Dorſetſhire.

CHALCAS, in botany: A genus of the monogynia order, belonging to the decandria claſs of plants. The calyx is quinquepartite; the corolla campanulated, with the petals heeled; the ſtigma round-headed and warty.

CHALCEDON, or Calcedon, anciently called Procerastis and Coleusa, a city of Bithynia, ſituated at the mouth of the Euxine, on the N. extremity of the Thracian Boſphorus, over againſt Byzantium. Pliny, Strabo, and Tacitus, call it *The City of the Blind;* alluding to the anſwer which the Pythian Apollo gave to the founders of Byzantium, who, conſulting the oracle relative to a place where to build a city, were directed to chooſe that ſpot which lay oppoſite "to the habitation of the blind;" that is, as was then underſtood, to Chalcedon: the Chalcedonians well deſerving that epithet for having built their city in a barren and ſandy ſoil, without ſeeing that advantageous and pleaſant ſpot on the oppoſite ſhore, which the Byzantines afterwards choſe.—Chalcedon became famous A. D. 451, on account of the council which was held there againſt Eutyches. The emperor Valens cauſed the walls of this city to be levelled with the ground for ſiding with Procopius, and the materials to be conveyed to Conſtantinople, where they were employed in building the famous Valentinian aqueduct. Chalcedon is at preſent a poor place, known to the Greeks by its ancient name, and to the Turks by that of *Cadiaci, i. e.* the judge's town.

CHALCEDONIANS, the people of Chalcedon. See laſt article.

CHALCEDONIUM. See Chalcidic.

CHALCEDONY, in natural hiſtory, a genus of the ſemipellucid gems. They are of a regular ſtructure, not tabulated; of a ſemi-opaque cryſtaline baſis; and variegated with different colours, diſpoſed in form of miſts or clouds, and, if nicely examined, found to be owing to an admixture of various coloured earths, but imperfectly blended in the maſs, and often viſible in diſtinct moleculæ. —It has been doubted whether the ancients were acquainted with the ſtone we call *chalcedony;* they having deſcribed a Chalcedonian carbuncle and emerald, neither of which can at all agree with the characters of our ſtone; but they have alſo deſcribed a Chalcedonian jaſper, which ſeems to have been the ſtone they deſcribe by the word *turbida*, which extremely well agrees with our chalcedony. There are 4 known ſpecies of the chalcedony. 1. A bluiſh white one. This is the moſt common of all, and is found in the ſhape of our flints and pebbles, in maſſes of 2 or 3 inches or more in diameter. It is of a whitiſh colour, with a faint cloud of blue diffuſed all over it, but always in the greateſt degree near the ſurface. This is leſs hard than the oriental onyx. The oriental chalcedonies are the only ones of any value; they are found in vaſt abundance on the ſhores of rivers in all parts of the Eaſt Indies, and frequently come over among the ballaſt of the Eaſt India ſhips. They are common in Sileſia, Bohemia, and other parts of Europe; but with us are leſs hard, more opaque, and of very little value. 2. The dull milky veined chalcedony. This is a ſtone of little value; and is ſometimes met with among our lapidaries, who miſtake it for a kind of nephritic ſtone. It is of a yellowiſh white or cream colour, with a few milk white veins. This is principally found in New Spain. 3. The browniſh, black, dull, and cloudy chalcedony, known to the ancients by the name of ſmoky jaſper, or jaſpis capnitis. This is the leaſt beautiful ſtone of all the claſs: it is of a pale browniſh white, clouded all over with a blackiſh miſt, as the common chalcedony is with a blue. It is common in the Eaſt and Weſt Indies, and in Germany; but is very little valued, and is ſeldom worked into any thing better than the handles of knives. 4. The yellow and red chalcedony is greatly ſuperior to all the reſt in beauty; and is in great repute in Italy, though very little known among us. It is naturally compoſed of an admixture of red and yellow only, on a clouded cryſtalline baſis; but is ſometimes found blended with the matter of common chalcedony, and then is mixed with blue. It is all over of the miſty hue of the common chalcedony. This is found only in the Eaſt Indies, and there not plentifully. The Italians make it into beads, and call theſe *caſſidonies;* but they are not determinate in the uſe of the word, but call beads of ſeveral of the agates by the ſame name. All the chalcedonies readily give fire with ſteel, and make no efferveſcence with aquafortis.

CHALCEMBOLON, in antiquity, a ſhip with a brazen roſtrum.

CHALCIDENE, or Chalcidice, in ancient geography, an inland country of Syria, having Seleucia on the W. Cyrrheſtica on the N. Apamene and Cœleſyria on the S. and Chalybonitis on the E. being ſo called from its principal city Chalcis. This province, one of the moſt fruitful in Syria, was ſeized by Ptolemy the ſon of Mennæus during the troubles of Syria, and by him made a ſeparate kingdom. Ptolemy himſelf is called by Joſephus and Hegeſippus only *prince* of Chalcis, but his ſon Lyſanias is ſtiled *king* both by Joſephus and Dio. Upon the death of Antiochus Dionyſius king of Syria, Ptolemy attempted to make himſelf maſter of Damaſcus and all Cœleſyria; but the inhabitants, having an utter averſion to him on account of his cruelty, choſe rather to ſubmit to Aretas king of Arabia, by whom Antiochus and his whole army had been cut off. He oppoſed Pompey on his entering Syria; but was by him defeated, taken priſoner, and ſentenced to death; which, however, he eſcaped by paying 1000 talents, and was alſo left in the poſſeſſion of his kingdom. After Ariſtobulus king of Judea had been poiſoned by the friends of Pompey, and Alexander his ſon beheaded at Antioch, he ſent Philippion his ſon to Aſcalon, whither the widow of Ariſtobulus had retired with her other children, to bring them all to Chalcis; propoſing, as he was in love with one of the daughters named Alexandra, to maintain them in his own kingdom in a manner ſuitable to their rank: but Philippion, likewiſe being in love with Alexandra, married her on the way; for which preſumption Ptolemy put him to death on his return, and then took her to himſelf. On account of his affinity, he ſupported to the utmoſt of his power Antigonus the younger ſon of Ariſtobolus, who took the field at the head of a conſiderable army, but on his entering Judæa was entirely defeated by Herod. Ptolemy ſoon after died, and was ſucceeded by his ſon Lyſanias; who, eſpouſing the cauſe of the Aſmonæan family with great warmth, promiſed to Barzaphernes who commanded the Parthian troops in Syria, and to Pacorus the king's ſon, 1000 talents and 500 women, provided they ſhould put Antigonus in poſſeſſion of the kingdom of Judæa, and depoſe Hyrcanus. He was not long after put to death by Marc Antony, at the inſtigation of Cleopatra; who accuſed him falſely of having entered into an alliance with the Parthians, that ſhe might get poſſeſſion of his dominions.

CHALCIDIC, Chalcidicum, or Chalcedonium, in ancient architecture, a large magnificent hall belonging to a court of juſtice. Feſtus ſays, it took its name from the city Chalcis. Philander will have it to be the court where affairs of money and coinage were regulated; ſo called from χαλκος, braſs, and δικη, juſtice. Others ſay, the money was ſtruck in it; and derive the word from χαλκος, and οικοι, houſe. In Vitruvius, it is uſed for the auditory of a baſilica; in other ancient writers for a hall where the heathens imagined their gods dined.

(1.) CHALCIDICE, in ancient geography, an eaſtern diſtrict of Macedonia, ſtretching northwards between the Sinus Toronæus and Singiticus; formerly a part of Thrace, but taken by Philip.

(2.) Chalcidice. See Chalcidene.

CHALCIDIUS, a famous platonic philoſopher in the 3d century, who wrote a commentary on Plato's Timæus, which is eſteemed. This work has been tranſlated from the Greek into Latin.

(1.) CHALCIS, a mountain of Ætolia.

(2—5.) Chalcis, the name of 4 ancient cities; viz. 1. in Ætolia, near the mouth of the Evenus, on the Ionian Sea, at the foot of the mountain, (N° 1.) and therefore called by ſome Hypochalcis: 2. the capital of Chalcidene in Syria, near Libanus, and a mountain or river called *Belus;* hence diſtinguiſhed by Pliny, by the epithets, *ad Libanum*, and *ad Belum:* 3. in Chalcidice, near Olynthus: and, 4. in Eubœa, on the Euripus, the country of the poet Lycophron.

(1.) CHALCITIS, an iſland oppoſite to Chalcedon, mentioned by Pliny.

(2.) Chalcitis, one of the diviſions of Meſopotamia, S. of Anthemuſia, the moſt northern diſtrict, next to Armenia, and ſituated between Edeſſa and Carræ.

* CHALCOGRAPHER. *n. ſ.* [χαλκογραφος, of χαλκος, braſs, and γραφω, to write or engrave.] An engraver in braſs.

* CHALCOGRAPHY. *n.* [χαλκογραφια.] Engraving in braſs.

CHALCOLIBANON, a word which occurs in the Apocalypſe of St John, and which is generally tranſlated *braſs;* but which, Mr Chambers ſays, interpreters have very much miſunderſtood. It is formed of χαλκος, braſs, and *olibanum*, frankincenſe; and he argues when the name of a metal is prefixed to another word, it only denotes the thing to be of the colour of that metal. He therefore tranſlates it, *frankincenſe of the colour of braſs.*

CHALCOMB, a village in Northamptonſhire, near Oxford.

(1.) CHALCONDYLAS, Demetrius, a learned Greek, born at Conſtantinople, who left that city after its being taken by the Turks, and afterwards taught Greek in ſeveral cities of Italy. He compoſed a Greek grammar; and died at Milan in 1513.

(2.) Chalcondylas, Laonicus, a famous Greek hiſtorian of the 15th century, born at Athens. He wrote an excellent hiſtory of the Turks, from Ottoman, who reigned about A. D. 1300, to Mahomet II. in 1463.

CHALCOPTHONGUS, a ſpecies of black marble mentioned by Pliny, which when ſtruck upon, ſounded like braſs.

CHALCUS, [χαλκος, Gr.] See Æreolus.

CHALCAIC. See Chaldee, § 1, 2.

CHALDEA, in ancient geography, 1. in a large ſenſe, included Babylonia; as in the prophecies of Jeremiah and Ezekiel. 2. In a reſtricted ſenſe, it denoted a province of Babylonia, towards Arabia Deſerta; called in Scriptute *The land of the Chaldeans.* It is ſaid to have been named from Chaled the 4th ſon of Nahor. See Babylonia, Irac Arabia, and Astronomy, *Index.*

CHALDEANS, the people of Chaldea.

CHALDECOTE, a village in Purbeck iſle, Dorſetſhire, E. of Smedmore.

(1.) CHALDEE, or Chaldaic, language, that ſpoken by the Chaldeans. It is a dialect of the Hebrew.

(2.) Chaldee paraphrase, in the rabbinical ſtyle, is called Targum. There are 3 Chaldee paraphraſes in Walton's Polyglot; viz. 1. of Onkelos; 2. of Jonathon ſon of Uziel; and 3. of Jeruſalem. See Bible, § 19.

* CHALDER. Chaldron. Chaudron. *n. ſ.* A dry Engliſh meaſure of coals, conſiſting of 36 buſhels heaped up, according to the ſealed buſhel kept at Guildhall, London. The *chaldron* ſhould weigh 2000 lb. *Chambers.*

CHALDON, East, } two towns in Dorſetſhire,
Chaldon West, } between Wareham and
Weymouth.

CHALDOWN, NE. of Ryegate, Surry.

CHALDRON. See Chalder. On ſhipboard, 21 chaldrons of coals are allowed to the ſcore.

(1.) CHALDWELL, a town NE. of Tilbury, Eſſex.

(1.) CHALE, a river of China, which riſes in the kingdom of Laſſa, and falls into the Gulf of Cochin China.

(2.) Chale, a village in the Iſle of Wight.

CHALESWORTH, in the Peak of Derby.

CHALEUR BAY, a deep broad bay of North America, W. of the Gulf of St Lawrence.

CHALFONT St Gires; } two villages, near
Chalfont St Peters; } Amerſham, Bucks.

CHALFORD, two towns; 1. in Biſley pariſh, Glouceſterſhire; 2. one mile from Oxford.

CHALGRAVE, two villages; 1. in Bedfordſhire, S. of Tuddingham: 2. in Oxfordſhire, NE. of Dorcheſter.

(1.) * CHALICE. *n. ſ.* [*calic*, Sax. *calice*, Fr. *calyx*, Lat.] 1. A cup or bowl.—

When in your motion you are hot,
And that he calls for drink, I'll have prepar'd him,
A *chalice* for the nonce. *Shakeſpeare.*

2. It is generally uſed for a cup uſed in acts of worſhip.—All the church at that time did not think emblematical figures unlawful ornaments on cups or *chalices*. *Stillingfleet.*

(2.) Chalice (§ 1. *def.* 2.) is peculiarly applied to the cup uſed to adminiſter the wine in the ſacrament, and by the Roman Catholics in the maſs. The uſe of the chalice, or communicating in both kinds, is by the church of Rome denied to the laity, who communicate only in one kind; the clergy alone being allowed the privilege of communicating in both kinds; in direct oppoſition to our Saviour's words, "Drink ye *all* of it."

* CHALICED. *adj.* [from *calyx*, Lat. the cup of a flower.] Having a cell or cup: applied by *Shakeſpeare* to a flower, but now obſolete.—

Hark, hark! the lark at heaven's gate ſings,
And Phœbus 'gins ariſe,
His ſteeds to water at thoſe ſprings,
On *chalic'd* flowers that lies. *Shakeſp.*

CHALIZA, in the Jewiſh cuſtoms, the ceremony whereby a widow pulls off her brother-in-law's ſhoes, who ſhould eſpouſe her, and thus is at liberty to marry whom ſhe pleaſes.

(1.) * CHALK. *n. ſ.* [*cealc*, *cealcſtan*, Sax. *calck*, Welch.] *Chalk* is a whitiſh foſſile, uſually reckoned a ſtone, but by ſome ranked among the boles. It is uſed in medicine as an abſorbent, and is celebrated for curing the heartburn. *Chambers.*—*Chalk* is of two ſorts; the hard, dry, ſtrong *chalk*, which is beſt for lime; and a ſoft, unctuous *chalk*, which is beſt for land, becauſe it eaſily diſſolves with rain and froſt. *Mortimer.*

With *chalk* I firſt deſcribe a circle here,
Where theſe ethereal ſpirits muſt appear. *Dryd.*

(2.) Chalk, Creta, is a white earth found plentifully in Britain, France, Norway, and other parts of Europe, ſaid to have been anciently dug chiefly in the iſland of Crete, and thence to have received its name *Creta*. They have a very eaſy way of digging chalk in the county of Kent in England. It is there found on the ſides of hills; and the workmen undermine it ſo far as appears proper; then digging a trench at the top as far diſtant from the edge as the undermining goes at bottom, they fill this with water, which ſoaks through in the ſpace of a night, upon which the whole flake falls down at once. In other parts of the kingdom, chalk generally lies deeper, and they are forced to dig for it at conſiderable depths, and draw it up in buckets. Chalk whether burnt into lime or not, is in many caſes an excellent manure. See Rural Economy. Pure chalk melts eaſily with alkali and flint into a tranſparent colourleſs glaſs. With alkaline ſalts it melts ſomewhat more difficultly, and with borax more eaſily, than with flint or ſand. It requires about half its weight of borax, and its whole weight of alkali, to fuſe it. Sal mirabile and ſandiver, which do not vitrify at all with the cryſtalline earths, form with half their weight of chalk, the firſt a yellowiſh black, the latter a greeniſh, glaſs. Nitre, one of the moſt active fluxes for flint, does not perfectly vitrify with chalk. This earth notably promotes the vitrification of flint; a mixture of the two requiring leſs alkali than either of them ſeparately. If glaſs made from flint and alkali is further ſaturated with the flint, ſo as to be incapable of bearing any further addition of that earth without becoming opaque and milky, it will ſtill in a ſtrong fire take up $\frac{1}{3}$ or $\frac{1}{2}$ of its weight of chalk, without injury to its tranſparency. Hence chalk is ſometimes made uſe of in compoſitions for glaſs, as a part of the ſalt may then be ſpared. Chalk has alſo a great effect in melting the ſtony matters intermixed with metallic ores, and hence might be of uſe in ſmelting ores: as indeed limeſtone is uſed for that purpoſe. But when deprived of its fixed air, and converted into limeſtone, it loſes much of its diſpoſition to vitrify. It then melts very difficultly and imperfectly, and renders the glaſs opaque and milky. Chalk readily imbibes water; and hence maſſes of it are employed for drying precipitates, lakes, earthy powders that have been levigated with water, and other moiſt preparations. Its uſes in cleaning and poliſhing metalline or glaſs utenſils are well known. When powdered and waſhed from any gritty matter it contains, it is called whiting. In medicine it is one of the moſt uſeful abſorbents, and is to be conſidered ſimply as ſuch. The aſtringent virtues, which ſome have attributed to it, have little foundation, unleſs in ſo far as the earth is ſaturated with an acid, with which it compoſes a ſaline concrete maniſeſtly ſub-aſtringent. See Chemistry, *Index.*

(3.) Chalk, in geography, a town of Kent, near Northfleet.

(4.) Chalk, Black, a name given by painters to a ſpecies of earth with which they draw on blue paper, &c. It is found in pieces from 2 to

10 feet long, and from 4 inches to 20 broad, generally flat, but ſomewhat riſing in the middle, and thinner towards the edges, commonly lying in large quantities together. While in the earth, it is moiſt and flaky: but being dried, it becomes conſiderably hard and very light; but always breaks in ſome particular direction; and if attentively examined when freſh broken, appears of a ſtriated texture. To the touch it is ſoft and ſmooth, ſtains very freely, and by virtue of the ſmoothneſs makes very neat marks. It is eaſily reduced into an impalable ſoft powder without any diminution of its blackneſs. In this ſtate it mixes eaſily with oil into a ſmooth paſte; and being diffuſed through water, it ſlowly ſettles in a black ſlimy or muddy form; properties which make its uſe very convenient to the painters both in oil and water colours. It appears to be an earth quite different from common chalk, and rather of the ſlaty bituminous kind. In the fire it becomes white with a reddiſh caſt, and very friable, retaining its flaky ſtructure, and looking much like the white flaky maſſes, which ſome ſorts of pit coal leave in burning. Neither the chalk nor theſe aſhes are at all affected by acids. The colour ſhops are ſupplied with this earth from Italy or Germany; though ſome parts of England afford ſubſtances nearly, if not entirely, of the ſame quality, and which are found to be equally ſerviceable for marking, and as black paints. Such particularly is the black earth, called KILLOW, ſaid by Dr Merret, in his *Pinax Rerum Britannicarum*, to be found in Lancaſhire; and by Mr Da Coſta, in his hiſtory of foſſils, to be plentiful near the top of Cay-Avon, a high hill in Merionethſhire.

(5.) **Chalk, Red**, an earth much uſed by painters and artificers, and common in the colour ſhops. It is properly an indurated clayey ochre; and is dug in Germany, Italy, Spain, and France, but in greateſt quantity in Flanders. It is of a fine, even, and firm texture; very heavy and very hard; of a pale red on the outſide, but of a deep duſky chocolate colour within. It adheres firmly to the tongue, is perfectly inſipid to the taſte, and makes no efferveſcence with acids.

(6.) **Chalk, Silver.** See Argentaria, N° 2.

(7.) **Chalk, Yellow.** See Tripoli.

* *To* **Chalk.** *v. a.* [from the noun.] 1. To rub with chalk.—

The beaſtly rabble then come down
From all the garrets in the town,
And ſtalls and ſhopboards in vaſt ſwarms,
With new *chalk'd* bills and ruſty arms. *Hudib.*

2. To manure with chalk.—Land that is *chalked*, if it is not well dunged, will receive but little benefit from a ſecond *chalking*. *Mortimer.* 3. To mark or trace out as with chalk.—

Being not propt by anceſtry, whoſe grace
Chalks ſucceſſours their way. *Shakeſpeare.*

—His own mind *chalked* out to him the juſt proportions and meaſures of behaviour to his fellow-creatures. *South.*

* **Chalk-cutter.** *n. ſ.* [from *chalk* and *cut*.] A man that digs chalk.—Shells, by the ſeamen called chalk eggs, are dug up commonly in the *chalk-pits*, where the *chalk-cutters* drive a great trade with them. *Woodward.*

CHALKDOWN. See Chaldown.

Chalk-head, a village in Cumberland, near Caldbeck.

Chalk-hill, near Dunſtable, Bedfordſhire.

* **Chalk-pit.** *n. ſ.* [from *chalk* and *pit*.] A pit in which chalk is dug. See Chalk-cutter.

Chalk-stones, in medicine, ſignify the concretions of calcarous matter in the hands and feet of people violently afflicted with the gout. Leuwenhoek examined theſe by the microſcope; but his obſervations and diſtinctions have led to nothing uſeful, with regard to the nature or cure of the diſeaſe.

Chalk-street, a village in Kent, between Chalk and Graveſend.

Chalk-well, near Settingbourn. Kent.

(1.) * **CHALKY.** *adj.* [from *chalk*.] 1. Conſiſting of chalk; white with chalk.—

As far as I could ken the *chalky* cliffs,
When from thy ſhore the tempeſt beats us back,
I ſtood upon the hatches in the ſtorm. *Shakeſp.*

2. Impregnated with chalk.—*Chalky* water towards the top of earth is too fretting. *Bacon.*

(2.) **Chalky land.** Barley and wheat ſucceed very well on the better ſort of chalky land, and oats generally do well on any kind of it. The natural produce of this ſort of land in weeds, is that ſort of ſmall vetch, called the *tine-tare*, with poppies, may-weed, &c. Sainfoil and hop-clover will generally ſucceed pretty well on theſe lands; and, where they are of the better ſort, the great clover will do. The beſt manure is dung, old rags, and the ſheep dung left after folding them.

CHALLANS, a town of France, in the department of the Upper Loire. Its late Benedictine Abbey was much celebrated. It lies 12 miles E. of Brioude.

(1.) * **CHALLENGE.** *n. ſ.* [from the verb.] 1. A ſummons to combat.—

I never in my life
Did hear a *challenge* urg'd more modeſtly. *Shak.*

2. A demand of ſomething as due.—

Taking for his younglings,
Leſt greedy eyes to them might *challenge* lay,
Buſy with oker did the ſhoulders mark. *Sidney.*

—There muſt be no *challenge* of ſuperiority, or diſcountenancing of freedom. *Collier of Friendſhip.* 3. [In law.] An exception taken either againſt perſons or things; perſons, as in aſſize to the jurours, or any one or more of them, by the priſoner at the bar. *Challenge* made to the jurours, is either made to the array, or to the poll: *Challenge* made to the array is, when the whole number is excepted againſt, as partially impannelled: *challenge* to or by the poll, is when ſome one or more, are excepted againſt, as not indifferent: *challenge* to the jurours is divided into *challenge* principal, and *challenge* for cauſe: *challenge* principal is that which the law allows without cauſe alleged, or further examination; as a priſoner at the bar, arraigned upon felony, may peremptorily *challenge* to the number of 20, one after another, of the jury empannelled upon him, alleging no cauſe. *Cowel.*—

You are mine enemy, I make my *challenge*,
You ſhall not be my judge. *Shakeſpeare.*

(II.) *A* **Challenge** to fight a duel, by word or letter, or be the bearer of ſuch a challenge, is puniſhable by fine and impriſonment, on indictment or information. See Duel.

(III.) Challenge, in the law of England, (§ I. *def.* 3.) is an exception made to jurors, (See Trial,) either in civil or criminal caſes.

i. Challenges, in civil cases, are of two ſorts; challenges to the *array*, and challenges to the *poll*.

1. Challenges to the array, as above defined, (§ 1. *def.* 3.) may be made upon account of partiality or ſome default of the ſheriff or his under officer who arrayed the panel. Alſo, though there be no perſonal objection againſt the ſheriff, yet if he arrays the panel at the nomination, or under the direction of either party, this is good cauſe of challenge to the array. Formerly the jury was to come *de vicineto, i. e.* from the immediate neighbourhood; but by ſtatute 4 and 5 Ann. c. 16. this was aboliſhed upon all civil actions, except upon penal ſtatutes; and upon thoſe alſo by the 24 Geo. II. c. 18. the jury being now only to come *de corpore comitatus, i. e.* from the body of the county at large. The array by the ancient law may alſo be challenged, if an alien be party to the ſuit, and, upon a rule obtained by his motion to the court for a jury *de medietate linguæ*, ſuch a one be not returned by the ſheriff purſuant to the ſtatute 28 Edward III. c. 13. enforced by 8 Henry VI. c. 29. which enacts, that where either party is an alien born, the jury ſhall be one half denizens and the other aliens (if ſo many be forthcoming in the place,) for the more impartial trial: A privilege as ancient in England as the time of K. Ethelred, in whoſe ſtatute *de monticolis Walliæ* (then aliens to the crown of England,) c. 3 it is ordained, "duodeni legales homines, quorum ſex Walli et ſex Angli erunt, Anglis et Wallis jus dicunto."

2. Challenges to the polls, *in capita*, are exceptions to particular jurors; and ſeem to anſwer the *recuſatio judicis* in the civil and canon laws; by the conſtitution of which, a judge might be refuſed upon any ſuſpicion of partiality. But it is now held that judges or juſtices cannot be challenged. But challenges to the polls of the jury are reduced to 4 heads by Sir Edward Coke: 1. *Propter honoris reſpectum;* as, if a lord of parliament be impannelled on a jury, he may be challenged by either party, or he may challenge himſelf. 2. *Propter defectum;* as, if a juryman be an alien born, this defect is of birth; if he be a ſlave or bondman, this is defect of liberty, and he cannot be a *liber et legalis homo.* Females are alſo excluded, *propter defectum ſexus;* except when a widow feigns herſelf with child in order to exclude the next heir, and a ſuppoſititious birth is ſuſpected to be intended; then, upon the writ *de ventre inſpiciendo*, a jury of women is to be impannelled to try the queſtion whether ſhe be with child or not. But the principal deficiency is defect of eſtate ſufficient to qualify a man to be a juror, which depends upon a variety of ſtatutes. See *Blackſt. Com.* III. 362. *Propter affectum*, for ſuſpicion of bias or partiality. This may be either a principal challenge, or to the favour. A *principal* challenge is ſuch, where the cauſe aſſigned carries with it, *prima facie*, evident marks of ſuſpicion either of malice or favour: as, that a juror is of kin to either party within the 9th degree; that he has an intereſt in the cauſe; that he has taken money for his verdict, &c. which, if true, cannot be overruled, for jurors muſt be *omni exceptione majores.* Challenges *to the favour*, are where the party objects only ſome probable circumſtances of ſuſpicion, the validity of which muſt be left to the determination of *triers*. 4. Challenges *propter delictum*, are for ſome crime or miſdemeanor that affects the juror's credit, and renders him infamous: As for a conviction of treaſon, felony, perjury, or conſpiracy; or if, for ſome infamous offence, he hath received judgment of the pillory or the like.

ii. Challenges, in criminal cases, may be made either on the part of the king, or on that of the priſoner; to the whole army, or to the ſeparate polls, for the ſame reaſons that they may be in civil cauſes. For it is here at leaſt as neceſſary as there, that the ſheriff or returning officer be totally indifferent; that, where an alien is indicted, the jury ſhould be *de medietate*, or half foreigners, if ſo many are found in the place (which does not indeed hold in treaſons, aliens being very improper judges of the breach of allegiance; nor yet in the caſe of Egyptians, under the ſtatute 22 Henry VIII. c. 10.); that on every panel there ſhould be a competent number of hundreders; and that the particular jurors ſhould be *omni exceptione majores*, not liable to any objections whatever. Challenges on any of the foregoing accounts are ſtyled challenges *for cauſe;* which may be without ſtint in both civil and criminal trials. But in criminal caſes, or at leaſt in capital ones, there is, *in favorem vitæ* allowed to the priſoner an arbitrary and capricious ſpecies of challenge to a certain number of jurors, without ſhowing any cauſe at all; which is called a *peremptory challenge:* a proviſion full of that tenderneſs and humanity to priſoners for which our laws are juſtly famous. This is grounded on two reaſons: 1. As every one muſt be ſenſible what ſudden impreſſions and unaccountable prejudices we are apt to conceive upon the bare looks and geſtures of another; and how neceſſary it is, that a priſoner, when put to defend his life, ſhould have a good opinion of his jury, the want of which might totally diſconcert him; the law wills not that he ſhould be tried by any one man, againſt whom he has conceived a prejudice, even without being able to aſſign a reaſon for ſuch his diſlike. 2. Becauſe upon challenges for cauſe ſhown, if the reaſon aſſigned prove inſufficient to ſet aſide the juror, perhaps the bare queſtioning his indifference may ſometimes provoke a reſentment; to prevent all ill conſequences from which, the priſoner is ſtill at liberty, if he pleaſes, peremptorily to ſet him aſide. This privilege of peremptory challenges, granted to the priſoner, is denied to the king by the ſtatute 33 Edw. I. ſtat. 4. which enacts, that the king ſhall challenge no jurors without aſſigning a cauſe certain to be tried and approved by the court. However, it is held that the king need not aſſign his cauſe of challenge till all the panel is gone through, and unleſs there cannot be a full jury without the perſons ſo challenged. And then, and not ſooner, the king's counſel muſt ſhow the cauſe: otherwiſe the juror ſhall be ſworn.

The peremptory challenges of the priſoner muſt, however, have ſome reaſonable boundary; otherwiſe he might never be tried. This reaſonable boundary is ſettled by the common law to the number of 35; or, one under the number of three full juries. For the law judges, that 35 are fully ſufficient to allow the moſt timorous man to challenge through mere caprice; and that he who peremptorily challenges a greater number, or three full juries, has no intention to be tried at all. And therefore it deals with one who peremptorily challenges above 35, and will not retract his challenge, as with one who ſtands mute or refuſes his trial; by ſentencing him to the *peine forte et dure* in felony, and by attainting him in treaſon. And ſo the land ſtands at this day with regard to treaſon of any kind. But by ſtatute 22 Hen. VIII. c. 14. (which with regard to felonies, ſtands unrepealed,) no perſon arraigned for felony can be admitted to make more than 20 peremptory challenges.

(1.) * *To* Challenge. *v. a.* [*challenger*, Fr.] 1. To call another to anſwer for an offence by combat.—

The prince of Wales ſtept forth before the king,
And, nephew, *challeng'd* you to ſingle fight.
Shakeſpeare.

2. To call to a conteſt.—I *challenge* any man to make any pretence to power by right of fatherhood, either intelligible or poſſible. *Locke.* 3. To accuſe.—Many of them be much loſels and ſcatterlings, as that they cannot eaſily by any ſheriff be gotten, when they are *challenged* for any ſuch fact. *Spenſer on Ireland.* 4. [In law.] To object to the impartiality of any one. [See the noun.]—Though only 12 are ſworn, yet 24 are to be returned, to ſupply the defects or want of appearance of thoſe that are *challenged* off, or make default. *Hale.* 5. To claim as due.—That divine order, whereby the pre-eminence of chiefeſt acceptation is by the beſt things worthily *challenged*. *Hooker.*—

Which of you, ſhall we ſay, doth love us moſt?
That we our largeſt bounty may extend,
Where nature doth with merit *challenge*. *Shak.*

6. To call any one to the performance of conditions.—I will not *challenge* you of your promiſe, to give me certain rules as to the principles of blazonry. *Peacham on Drawing.*

(2.) * *To* Challenge. *v. a.* among hunters. When hounds or beagles, at firſt finding the ſcent of their game, preſently open and cry, they are ſaid to challenge.

(1.) * CHALLENGER. *n. ſ.* [from *challenge*.] 1. One that defies or ſummonſes another to combat.

Death was denounc'd;
He took the ſummons, void of fear,
And unconcernedly caſt his eye around,
As if to find the griſly *challenger*. *Dryden.*

2. One that claims ſuperiority.—

Whoſe worth
Stood *challenger* on mount of all the age,
For her perfections. *Shak.*

3. A claimant; one that requires ſomething as of right.—Earneſt *challengers* there are of trial, by ſome publick diſputation. *Hooker.*

CHALLOCK, a town in Kent, W. of the Wye.

CHALLONE, a town of France, in the ci-devant province of Anjou.

CHALLONS. See Chalons.

CHALLORN, a town in W. Medina, Wight.

CHALMINGTON, a town in Dorſetſhire, 1 mile from Carſtock.

(1.) CHALONER, Sir Thomas, a ſtateſman, ſoldier, and poet, deſcended from an ancient family in Denbigh in Wales, was born at London about A. D. 1515. Having been educated in both univerſities, he was introduced to Henry VIII. who ſent him abroad in the retinue of Sir Henry Knevet, ambaſſador to Charles V. whom he attended on his fatal expedition in 1541. See Algiers, § 3. Soon after the fleet left that place, he was ſhipwrecked on the coaſt of Barbary in a very dark night, and having exhauſted his ſtrength by ſwimming, he chanced to ſtrike his head againſt a cable, which he had the preſence of mind to catch hold of with his teeth; and with the loſs of ſeveral of them, was drawn up by it into the ſhip to which he belonged. Mr Chaloner returned ſoon after to England, and was appointed firſt clerk of the council, which office he held during the reſt of that reign. On the acceſſion of Edward VI. he became a favourite of the D. of Somerſet, whom he attended to Scotland, and was knighted by him, after the battle of Muſſelburgh, in 1547. The duke's fall put a ſtop to Sir Thomas's expectations, and involved him in difficulties. During the reign of Mary, being a proteſtant, he was in danger; but having many powerful friends, he eſcaped. On the acceſſion of queen Elizabeth, he appeared again at court; and was appointed ambaſſador to the emperor Ferdinand I. being the firſt ambaſſador ſhe nominated. His commiſſion was of great importance; and the queen was ſo well ſatisfied with his conduct, that, ſoon after his return, ſhe ſent him in the ſame capacity to Spain. He embarked for Spain in 1561, and returned to London in 1564, in conſequence of his own requeſt, expreſſed in an elegy written in imitation of Ovid. He died in 1565. Sir Thomas excelled in every thing to which he applied himſelf. He made a conſiderable figure as a poet. His poetical works were publiſhed in 1579. His capital work was that *Of Reſtoring the Engliſh Republic*, in 10 books, which he wrote while he was in Spain. This great man, who knew how to tranſact as well as write upon, the moſt important affairs of ſtates and knigdoms, could deſcend to compoſe a *Dictionary for Children*, and to tranſlate from the Latin a book *Of the Offices of Servants*, merely for the utility of the ſubjects.

(2.) Chaloner, Sir Thomas, the only ſon of the preceding, (N° 1.) was born in 1559. He merits particular notice, not only as a ſkilful naturaliſt in an age wherein natural hiſtory was very little underſtood, in this or any other country; but as the founder of the alum works in Yorkſhire, which have ſince proved ſo advantageous to the commerce of this kingdom. Being very young when his father died, lord Burleigh ſent him to St Paul's ſchool and afterwards to Magdalen college, Oxford, where he diſcovered extraordinary talents for Latin and Engliſh poetry. About 1580, he made the tower of Europe, and returned to England

land before 1584. About this time he married the daugther of Sir William Fleetwood. In 1591, he was knighted; and, ſometime after, diſcovered the alum mines on his eſtate at Giſborough, in Yorkſhire. Towards the end of the queen's reign, Sir Thomas viſited Scotland; and returning to England in the retinue of king' James I. was immediately appointed governor to prince Henry. Some years before the death of that prince, he married a 2d wife, the daughter of Mr Blount of London, by whom he had his heir Sir William, and other children. He died in 1615. He wrote 1. Dedication to Lord Burleigh, of his father's poetical works, dated 1579. 2. The virtue of Nitre. Lond. 1584, 4to. Sir Thomas during his reſidence in Italy, being particularly fond of natural hiſtory, had ſpent ſome time at Puzzoli, where he was very attentive to the art of producing alum. This attention proved infinitely ſerviceable to his country, though of no great benefit to himſelf or his family, his attempt being attended with much difficulty and expence. It was begun about A. D. 1600, but was not brought to any perfection till ſome time in the reign of Charles I. by the aſſiſtance of one Ruſſel a Walloon, and two other workmen from the alum works at Rochelle. By one of the arbitrary acts of Charles, it was then deemed a mine royal, and granted to Sir Paul Pindar. The long parliment adjudged it a *monopoly*, and juſtly reſtored it to the original proprietors.

CHALONNOIS, the name of two ci-devant territories of France; viz. 1. in Burgundy: and 2. in Champagne.

(1.) CHALONS, or CHALLONS SUR MARNE, a handſome town of France in the department of Marne, lately an epiſcopal ſee in the province of Champagne. It contains 15,000 inhabitants who carry on a conſiderable trade in ſhalloons and other woollen ſtuff. The famous promenade, called the *Gard*, has been formed into a new ring much ſuperior to the former. Here is an academy of the ſciences, arts, and belles-lettres. Chalons is ſeated between two fine meadows on the rivers Marne, Mau, and Nau, 40 miles SW. of Verdun, and 95 E. of Paris. Lon. 4. 27. E. Lat. 48. 57. N.

(2.) CHALONS, or CHALLONS SUR SAONE, an ancient town of France, in the department of Saone and Loire, lately an epiſcopal ſee of the province of Burgundy. It is the ſtaple of iron for Lyons and St Etienne, and of the wines from exportation. The great Roman way from Lyons to Boulogne paſſed by Chalons; and it has various indications of Roman magnificence, particularly the ruins of an amphitheatre. The city contains the Old Town, the New Town, and the ſuburbs of St Lawrence. In the firſt is the court of Juſetice, a modern ſtructure, the cathedral, and the Hotel-de-ville. Chalons is ſeated on the Saone, 35 miles S. of Dijon. Lon. 4. 57. E. Lat. 46. 47. N.

CHALOUP, [Fr. *chaloupe*,] a ſmall ſloop.

CHALOW, a town in Berks, near Wantage.

CHALTON, 6 miles E. of Buſh-Waltham, Hampſhire.

(1.) * CHALYBEATE. *adj.* [from *chalybs*, Lat. ſteel.] Impregnated with iron or ſteel, having the qualities of ſteel.—The diet ought to ſtrengthen the ſolids, allowing ſpices and wine, and the uſe of *chalybeate* waters. *Arbuthnot on Diet.*

(2.) CHALBEATE. See MINERAL WATERS.

CHALYBES, in ancient geography, an ancient people of the Hither Aſia. Their ſituation is differently aſſigned; Strabo placing them in Paphlagonia, E. of Synope; Apollonius Rhodius and Stephanus, on the E. of the Thermodon, in Pontus; called HALIZONES by Homer. They either gave their name to, or took it from the iron manufactures, their only ſupport; the ſoil being barren and ungrateful.

(1.) CHAM, or CHAMB. See CHAMB.

(2.) CAAM, or KHAN. See KHAN.

CHAMA, in zoology, a genus of ſhell fiſh belonging to the order of vermes teſtacæ. The ſhell is thick, and has two valves; it is an animal of the oyſter kind. Linnæus enumerates 14 ſpecies, principally diſtinguiſhed by the figure of their ſhells. See *Plate* LXV. *fig.* 4, 5 & 6.

(1.) * CHAMADE. *n. ſ.* [French.] The beat of the drum which declares a ſurrender.—Several French battalions made a ſhew of reſiſtance; but, upon our preparing to fill up a little foſſe, in order to attack them, they beat the *chamade*, and ſent us charte blanche. *Addiſon.*

(2.) CHAMADE, is otherwiſe defined, a ſignal to inform the enemy that ſome propoſition is to be made to capitulate, to have leave to bury the dead, make a truce, or the like.

CHAMÆBUXUS, in botany. See POLYGALA.

CHAMÆCERASUS. See LONICERA.

CHAMÆDAPHNE. See MITCHELLA.

CHAMÆDRYS. See TEUCRIUM & VERONICA.

CHAMÆJASME, a ſpecies of STELLERA.

CHAMÆLEA. See CNEORUM.

CHAMÆLEON, in zoology. See CHAMELEON, and LACERTA.

CHAMÆLINUM, in botany. See LINUM.

CHAMÆMELUM. See ANTHEMIS.

CHAMÆNERION. See EPILOBIUM.

CHAMÆPITYS. See TEUCRIUM.

CHAMÆROPS, inbotany, the DWARF PALM, or LITTLE PALMETTO, a genus of the natural order of *palmæ*. The hermaphrodite calyx is tripartite; the corolla tripetalous; there are ſix ſtamina, 3 piſtils, and 3 monoſpermous plums. The male, is a diſtinct plant, the ſame as the hermaphrodite. There are two ſpecies, the moſt remarkable of which is the

CHAMÆROPS GLABRA, a native of the Weſt Indies, and warm parts of America, alſo of the correſponding latitudes of Aſia and Africa. It never riſes with a tall ſtem; but when the plants are old, their leaves are 5 or 6 feet long, and upwards of two broad; theſe ſpread open like a fan, having many foldings, and at the top are deeply divided like the fingers of a hand. This plant the Americans call *thatch*, from the uſe to which the leaves are applied. It may be eaſily raiſed in this country from ſeeds brought from America; but as the plants are tender, they muſt be conſtantly kept in a bark-ſtove.

CHAMÆXYLON. See GNAPHALIUM.

CHAMANIM, [from *chuman*, to burn,] in Jewiſh antiquity, is the Hebrew name for that which the Greeks call PYREIA; and St Jerom, in

Leviticus, has tranſlated SIMULACHRA; in Iſaiah, DELUBRA. According to Rabbi Solomon, they were idols expoſed to the ſun upon the tops of houſes. Aben Ezra ſays they were portable chapels made in the form of chariots, in honour of the ſun. See CHARIOT, § 3, and PYREIA.

CHAMARIM, [from *chamar*, black, Heb.] a word which occurs in ſeveral places of the Hebrew bible, and is generally tranſlated the *prieſts of the idols*, or the *prieſt clothed in black*. St Jerom, in 2 Kings, renders it ARUSPICES. In Hoſea and Zephaniah, he tranſlates it ÆDITUI, or church-wardens. But the beſt commentators think, that by this word is meant the prieſts of the falſe gods, particularly the worſhippers of fire; becauſe they were dreſſed in black; or perhaps the Hebrews gave them this name in deriſion, becauſe, as they were continually employed about the fuel, and keeping up the fire, they were always as black as ſmiths or colliers. We find prieſts, among thoſe of Iſis, called *melanephori*, *i. e.* wearers of *black*; but whether this was becauſe they dreſſed in black, or becauſe they wore a ſhining black veil in their proceſſions, is not certain. *Camar*, in Arabic, ſignifies the moon. Iſis is the ſame deity. Grotius thinks the name CAMILLI, among the Romans, came from the Hebrew *chamarim*. Thoſe who ſacrificed to the infernal gods were dreſſed in black.

(1.) CHAMB, a country of Germany, in the circle of Bavaria, between Bohemia and Bavaria.

(2.) CHAMB, a river in the above country.

(3.) CHAMB, the capital of the county, (N° 1.) ſeated on the river, (N° 2.) 37 miles NE. of Ratiſbon. Lon. 12. 55. E. Lat. 49. 14. N.

(I.) * CHAMBER. *n. ſ.* [*chambre*, Fr. *camera*, Lat. *ſiambr*, Welch.] 1. An apartment in a houſe; generally uſed for thoſe appropriated to lodging.—

Bid them come forth, and hear me,
Or at their *chamber* door I'll beat the drum,
Till it cry ſleep to death. *Shakeſpeare.*

2. Any retired room.—The dark caves of death, and *chambers* of the grave. *Prior.* 3. Any cavity or hollow.—Petit has, from an examination of the figure of the eye, argued againſt the poſſibility of a film's exiſtence in the poſteriour *chamber*. *Sharp.* 4. A court of juſtice.—In the Imperial *chamber* this vulgar anſwer is not admitted, *viz.* I do not believe it, as the matter is propounded and alleged. *Ayliffe's Parergon.* 5. The lower part of a gun where the charge is lodged. 6. A ſpecies of great gun.—Names given them, as cannons, demi-cannons, *chambers*, arquebuſe, muſket, &c. *Camden's Remains.* 7. The cavity where the powder is lodged in a mine.

(II.) CHAMBER, in military affairs, is variouſly applied: thus

1. CHAMBER, BOMB, or POWDER CHAMBER, a place ſunk under ground for holding the powder, or bombs, where they may be out of danger, and ſecured from the rain.

2. CHAMBER OF A MINE, (§ I. *def.* 7.) is moſt commonly of a cubical form.

3 CHAMBER OF A MORTAR, is that part of the chaſe, much narrower than the reſt of the cylinder, where the powder lies. It is of different forms; ſometimes like a reverſed cone; ſometimes globular, with a neck for its communication with the cylinder, whence it is called a bottled chamber; but moſt commonly cylindrical, that being the form which is found by experience to carry the ball to the greateſt diſtance.

(III.) CHAMBER, in policy, 1. The place where certain aſſemblies are held: 2. The aſſemblies themſelves. Of theſe ſome are eſtabliſhed for the adminiſtration of juſtice; others for commerical affairs. See § 1—8, 10, 11.

1. CHAMBER, APOSTOLICAL, of Rome, that wherein affairs relating the revenues of the church and the pope are tranſacted. This council conſiſts of the cardinal camerlingo, the governor of the rota, a treaſurer, an auditor, a preſident, one advocate general, a ſolicitor general a commiſſary, and 12 clerks.

2. CHAMBER, IMPERIAL, OF SPIRE, the ſupreme court of judicatory in the empire, erected by Maximillian I. This chamber has a right of judging by appeal; and is the laſt reſort of all civil affairs of the ſtates and ſubjects of the empire; except matrimonial cauſes, (theſe being left to the pope,) and criminal cauſes, which either belong to particular princes or towns, or are cognizable by all the ſtates of the empire in a diet. By the treaty of Oſnaburgh, in 1648, 50 aſſeſſors were appointed for this chamber, whereof 24 were to be Proteſtants, and 26 Catholics; beſides 5 preſidents, two Proteſtants, and 3 Catholics.

3. CHAMBER OF ACCOUNTS, a ci-devant court in France, where accounts were rendered of all the king's revenues, oaths of fidelity, taken and matters relating to the finances tranſacted. There were 9 of theſe; that of Paris was the chief; it regiſtered proclamations, treaties of peace, naturalizations, titles of nobility, &c.

4. CHAMBER OF ASSURANCE, 1. A ſociety of merchants and others for carrying on the buſineſs of inſuring. 2. A court of juſtice in Holland, where cauſes relating to inſurances are tried.

5. CHAMBER OF AUDIENCE, or GRAND CHAMBER, a ci-devant juriſdiction in each parliament of France.

6. CHAMBER OF BOOKSELLERS, a ci-devant engine of deſpotiſm under the late tyrannical government of France, intended to prevent the freedom of the preſs. It conſiſted of a ſyndic and aſſiſtants, elected by 4 delegates from the printers and 12 from the bookſellers, who, among other powers, had authority to ſearch for libels againſt the *honour of God*, and the *welfare of the ſtate*, whether printed within or without the kingdom.

7. CHAMBER OF COMMERCE, an aſſembly of merchants and traders, where affairs relating to trade are treated of. There are ſeveral eſtabliſhed in moſt of the chief cities of France; and in our country chambers of this kind have been lately erected, particularly in London, Edinburgh, and Glaſgow. Their exertions have been of no ſmall public benefit.

8. CHAMBER OF LONDON, an apartment in Guildhall, where the city money is depoſited.

9. CHAMBER OF THE EDICT, or *Chambre Miparti*, a ci-devant court in France, eſtabliſhed in favour of Proteſtants, but aboliſhed upon the repeal of the edict of Nantz. Its judges were one half Catholics, the other Proteſtants.

10. CHAMBER, PRIVY. Gentlemen of the pri-

vy chamber are ſervants of the king, who wait on him and the queen at court, in their diverſions, &c. Their number is 48 under the lord chamberlain; of whom 12 are in quarterly waiting, and two of theſe lie in the privy chamber. In the abſence of the lord chamberlain, or vice-chamberlain, they execute the king's orders: At coronations, two of them perſonate the dukes of Aquitain and Normandy; and ſix of them, appointed by the lord chamberlain, attend ambaſſadors from crowned heads to their audiences, and in public entries. The gentlemen of the privy chamber were inſtituted by Henry VII.

11. **Chambers, ecclesiastical,** ci-devant courts in France, which judged by appeal of differences reſpecting the collection of tythes.

12. **Chamber, star.** See Star-chamber.

* *To* **Chamber.** *v. n.* [from the noun.] 1. To be wanton; to intrigue.—Let us walk honeſtly as in the day, not in rioting and drunkenneſs, not in *chambering* and wantonneſs. *Romans.* 2. To reſide as in the chamber.—

The beſt blood *chamber'd* in his boſom. *Shakeſ.*

* **CHAMBERER.** *n. ſ.* [from *chamber.*] A man of intrigue.—

I have not thoſe ſoft parts of converſation,
That *chamberers* have. *Shakeſpeare.*

* **CHAMBERFELLOW.** *n. ſ.* [from *chamber* and *fellow.*] One that lies in the ſame chamber.—It is my fortune to have a *chamberfellow*, with whom I agree very well in many ſentiments. *Spectator.*

CHAMBER in the forest, two Engliſh villages; viz. 1. in Cheſhire, near Delamere: 2. in Derby, near Buxton Wells.

(1.) * **CHAMBERLAIN.** *n. ſ.* [from *chamber.*] 1. Lord great chamberlain of England is the 6th officer of the crown; a conſiderable part of his function is at a coronation; to him belongs the proviſion of every thing in the houſe of lords; he diſpoſes of the ſword of ſtate; under him are the gentleman uſher of the black rod, yeoman uſhers, and door-keepers. To this office the duke of Ancaſter makes an hereditary claim. *Chambers.* 2. Lord chamberlain of the houſehold has the overſight of all offices belonging to the king's chambers, except the precinct of the bed-chamber. *Chambers.*—

Humbly complaining to her deity,
Got my lord *chamberlain* his liberty. *Shakeſ.*

3. A ſervant who has the care of the chambers.—

When Duncan is aſleep, his two *chamberlains*
We will with wine and waſſel convince. *Shakeſ.*

4. A receiver of rents and revenues; as, *chamberlain* of the exchequer, of Cheſter, of the city of London. *Chambers.*

(2.) **Chamberlain, Great, of Scotland,** was ranked by K. Malcolm III. as the 3d great officer of the crown, and was called *Camerarius Domini Regis.* Before there was a treaſurer appointed, it was his duty to collect the revenue of the crown, and diſburſe the money for the king's expences, and the maintainance of his houſehold. After a treaſurer was appointed, his province was limited to the boroughs throughout the kingdom, where he was a ſort of juſtice general, as he had a power for judging of all crimes committed within the borough, particularly foreſtalling. He was to hold chamberlain ayres every year. He was ſupreme judge; nor could any of his decrees be queſtioned by an inferior judicatory. His ſentences were executed by the magiſtrates of the boroughs. He alſo regulated the prices of proviſions within the borough, and the fees of the workmen in the mint. His ſalary was only L.200 a year; but he had great fees, ariſing from eſcheats, fines, tolls, cuſtoms, &c. The rigorous exaction of theſe occaſioned great complaints of oppreſſion, and the chamberlain ayre was called rather a legal robbery than a court of juſtice. When the combined lords ſeized king James VI. Aug. 24, 1582, and carried him to Ruthven Caſtle, they iſſued a proclamation in the king's name, diſcharging the chamberlain ayres to be kept. This office was granted heritably to the family of Stuart, duke of Lenox; and when their male line failed, king Charles II. conferred it upon the duke of Monmouth, and on his forfeiture it went to the duke of Lenox; but that family ſurrendered the office to the crown in 1703.

(3.) **Chamberlain, Lord, of Great Britain,** (§ 1. *def.* 1.) has livery and lodging in the king's court; and receives fees from each Abp. or biſhop when they perform their homage to the king, and from all peers at their creation, or doing their homage. At the coronation of every king he has 40 ells of crimſon velvet for his own robes. On the coronation day, he brings the king his ſhirt, coif, and wearing clothes; and after the king is dreſſed, he claims his bed, and all the furniture of his chamber, for his fees: he alſo carries the coif, gloves and linen, to be uſed by the king on that occaſion; the ſword and ſcabbard; the gold to be offered by the king, and the robes royal and crown: he dreſſes and undreſſes the king on that day, waits on him before and after dinner, &c. To him alſo belongs the government of the palace of Weſtminſter.

(4.) **Chamberlain, Lord, of the household,** (§ 1. *def.* 2.) has the overſight of the removing wardrobes, or of beds, tents, revels, muſic, comedians, hunting, meſſengers, &c. retained in the king's ſervice. He has alſo the overſight and direction of the ſerjeants at arms, of all phyſicians, apothecaries, ſurgeons, barbers, the king's chaplains, &c. and adminiſters the oath to all officers above ſtairs.

(5.) **Chamberlain of Edinburgh,** an officer appointed by the Town Council, to collect the revenues and keep regular accounts of the income and expences of the city. This office is not of very ancient ſtanding, having been inſtituted only within theſe 50 or 60 years, with a view to leſſen the weight of buſineſs, that formerly fell upon the city treaſurer, who is annually elected along with the magiſtrates. The city chamberlain is not a member of the Town Council, but his office is permanent.

(6.) **Chamberlain of London** keeps the city money, which is laid up in the chamber of London: he alſo preſides over the affairs of maſters and apprentices, and makes free of the city, &c. His office laſts only a year; but it is cuſtomary to re-elect him, unleſs he is charged with a miſdemeanor in his office.

(7.) **Chamberlains of North Wales,**

Cheſter, &c. are the receivers of all rents and revenues belonging to the places whereof they are chamberlains.

(8.) Chamberlains of the exchequer. In this court there are two chamberlains, who keep a controlment of the pells of receipts and exitus, and have keys of the treaſury, records, &c.

* CHAMBERLAINSHIP. *n.ſ.* [from *chamberlain.*] The office of a chamberlain.

(1.) CHAMBERLAYNE, Edward, deſcended from an ancient family, was born in Glouceſterſhire, in 1616, and made the tour of Europe during the civil war. After the reſtoration, he went as ſecretary with the earl of Carliſle, to Sweden; was appointed tutor to the young duke of Grafton, and was afterwards pitched on to inſtruct prince George of Denmark in the Engliſh tongue. He died in 1703, and was buried in a vault in Chelſea church-yard. His monumental inſcription mentions ſix books of his writing; and that he was ſo deſirous of doing ſervice to poſterity, that he ordered ſome copies of his books to be covered with wax and buried with him. That work by which he is beſt known, is his *Angliæ Notitiæ, or the Preſent State of England,* which has been often re-printed.

(2.) Chamberlayne, John, F. R. S. ſon to Edward, (N° 1.) and continuator of his father's uſeful work, was admitted into Trinity College, Oxford, in 1685. He wrote "Diſſertations hiſtorical, critical, theological, and moral, on the moſt memorable events of the Old and New Teſtaments, with Chronological Tables;" in one vol. folio; and tranſlated various works from the French, Dutch, and other languages. He likewiſe communicated ſome pieces, to the Royal Society, inſerted in the Philoſophical Tranſactions. It is ſaid that he underſtood 16 languages; and it is certain that he was maſter of the Greek, Latin, French, High and Low Dutch, Portugueſe, and Italian. Though qualified for public employment, he had only that of Gentleman Uſher to George Prince of Denmark. After a uſeful and well-ſpent life, he died in 1724. He was very pious and earneſt in promoting the advancement of true Chriſtianity; for which purpoſe he carried on a large correſpondence abroad.

(1.) * CHAMBERMAID. *n.ſ.* [from *chamber* and *maid.*] A maid whoſe buſineſs is to dreſs a lady, and wait in her chamber.—When he doubted whether a word were intelligible or no, he uſed to conſult one of his lady's *chambermaids. Swift.*

(2.) Chambermaid, in this country, is uſed in quite a different ſenſe, from the above, (N° 1.) being applied, according to the original meaning of the word, ſolely to a young woman, who dreſſes the *chambers* or rooms of a houſe.

CHAMBERRY, a populous town of Italy, now annexed to France, being the capital of the department of Mont-Blanc, the ci-devant duchy of Savoy. It has a caſtle, and is well built, but has no fortifications. It is watered by ſeveral ſtreams, which have their ſources in St Martin's-hill, and run through ſeveral of the ſtreets. There are piazzas under moſt of the houſes, where people may walk dry in the worſt weather. It has large and handſome ſuburbs; and in the centre of the town is the palace. The parliament of Savoy formerly met in it. It is 27 miles NE. of Grenoble, and 85 NW. of Turin. Lon. 5. 50. E. Lat. 45. 35. N.

(1.) CHAMBERS, David, a Scots hiſtorian, prieſt, and lawyer, born in Roſs-ſhire, about 1530, and educated in the univerſity of Aberdeen. He went to France and Italy, where he continued ſome time, particularly at Boulogne, where, in 1556, he was a pupil of Marianus Sozenus. After his return to Scotland, he was appointed, by Q. Mary, parſon of Suddy and chancellor of Roſs. He was ſoon after employed in digeſting the laws of Scotland, and was principally concerned in publiſhing the acts of parliament of that kingdom by authority, in 1566. He was alſo appointed one of the lords of ſeſſion, and continued faithful to the queen, till her declining fortune obliged her adherents to ſeek for refuge in other kingdoms. Chambers went firſt to Spain, where he was graciouſly received by king Philip; and thence to Paris, where he was no leſs kindly received by Charles IX. to whom, in 1572, he preſented his hiſtory of Scotland, &c. He died at Paris in 1592. His writings were chiefly calculated to aſſiſt his royal miſtreſs, and to extol the wiſdom of the Scots.

(2.) Chambers, Ephraim, author of the Cyclopædia, was born at Milton, in Weſtmoreland. His parents were Preſbyterians; and his education ſuch as is intended to qualify a youth for trade. He was put apprentice to Mr Senex the globemaker, a buſineſs connected with aſtronomy and geography. During his reſidence with this ſkilful mechanic, he contracted that taſte for ſcience, which accompanied him through life. Even at this period, he formed the deſign of his grand work, the Cyclopædia; and ſome of the firſt articles of it were written behind the counter. Having conceived the idea of ſo great an undertaking, he juſtly concluded that the execution of it would not conſiſt with the avocations of trade; and therefore he quitted Mr Senex, and took chambers at Gray's Inn, where he chiefly reſided during the reſt of his life. The firſt edition, which was the reſult of many years intenſe application, appeared in 1728, in 2 vols folio. It was publiſhed by ſubſcription at 4 guineas, and the liſt of ſubſcribers was very reſpectable. The dedication to the king is dated October 15, 1727. The reputation that Mr Chambers acquired by this undertaking, procured him the honour of being elected F. R. S. Nov. 6, 1729. In leſs than ten years a 2d edition became neceſſary; which accordingly was printed, with corrections and additions, in 1738; and was followed by a 3d in 1739. Although the Cyclopædia was the grand buſineſs of Mr Chamber's life, and almoſt the ſole foundation of his fame, his attention was not wholly confined to this undertaking. He was concerned in a periodical publication, intituled, *The Literary Magazine,* which was begun in 1735. In this work he wrote a variety of articles, and particularly a review of Morgan's *Moral Philoſopher.* He was engaged, likewiſe, in conjunction with Prof. John Martyn, F. R. S. in preparing for the preſs a tranſlation and abridgment of the *Philoſophical Hiſtory and Memoirs of the Royal Academy of Sciences at Paris.* This undertaking was compriſed in 5 volumes 8vo, which did not appear till 1742, ſome time after our author's deceaſe, when they were publiſhed in the joint names of Meſſrs Martyn and Chambers. Mr Chambers is alſo ſaid to have publiſhed a tranſlation of the *Jeſuit's Perſpective*, from the French; which was printed in 4to, and went through ſeveral editions. His cloſe and unremitting attention to his ſtudies at length impaired his health, and obliged him to make an excurſion to the ſouth of France, but without that benefit which he hoped, and his friends wiſhed. Returning to England, he died at Canonbury Houſe, Iſlington, May 15, 1740, and was buried at Weſtminſter, where an inſcription, written by himſelf, is placed on the N. ſide of the cloyſters of the Abbey. After his death, other 2 editions of his Cyclopædia were publiſhed. The proprietors afterwards procured a ſupplement to be compiled, which extended to 2 vols more: And in 1778 began to be publiſhed in weekly numbers, an edition of both, improved, and incorporated into one alphabet, by Dr Rees, which was completed in 4 vols folio, and forms a very valuable work.

(3.) CHAMBERS, Sir Robert, an eminent judge, born at Newcaſtle-upon-Tyne, in 1737, where he received his education under Moyſes, along with lord Eldon and Sir William Scott; and the friendſhip they there contracted continued till death. He was choſen exhibitioner of Lincoln college, Oxford, in 1754, and afterwards became fellow of the Univerſity college, where he was again aſſociated with the Scotts and other eminent characters, particularly Sir William Jones. In 1766, ſo highly was his abilities and worth appreciated, that he was appointed vinerian profeſſor of law in the room of Sir William Blackſtone; and about the ſame time he was made principal of New Inn-hall. His profeſſional talents now became conſpicuous, and gained him the eſteem and friendſhip of the moſt diſtinguiſhed characters then in England, ſuch as the earls of Bathurſt, Mansfield, Liverpool, and Roſſlyn; lords Thurlow, Aſhburton, and Alvanley; as well as Johnſon, Burke, Goldſmith, Garrick, &c. In 1768 an offer was made him to go out as attorney-general of Jamaica, which he declined; but in 1773 he accepted the place of ſecond judge in the ſupreme court of judicature at Bengal; and ſuch was the regard which the univerſity entertained for him, that in caſe he ſhould think proper to return, they continued to him the profeſſorſhip three years. In 1778, the honour of knighthood was conferred on him as a teſtimony of the royal approbation of his upright conduct. He had married the daughter of Mr Milton the ſtatuary, before he went to India; and in 1782; he had the misfortune to loſe his eldeſt ſon, by the ſhipwreck of the Groſvenor Eaſt Indiaman, on her voyage to England, in which he was a paſſenger. In 1791, Sir Robert ſucceeded to the office of chief juſtice on the reſignation of Sir Elijah Impey; and in 1797 he was choſen preſident of the Aſiatic Society. He returned to England in 1799, but being of a delicate conſtitution, the change to a northern climate ſoon affected his health, to preſerve which he went to France in autumn, 1802, but died at Paris on the 9th of May following. His remains were brought to England and interred in the temple church. He was a man of conſiderable learning, poſſeſſed a fine taſte, united with a feeling ſenſe of religion, and the ſtricteſt integrity of conduct. He wrote an elegant epitaph in Latin, inſcribed on the monument of his friend, Sir William Jones, at Oxford. He had made a very valuable collection of oriental books.

(4.) CHAMBERS, Sir William, an eminent architect, was born at Stockholm, of an ancient Scotch family which had reſided ſome years there. When about 18 years of age, he was appointed ſupercargo to the Swediſh Eaſt India company, and brought from China the Aſiatic ſtile of Ornament, which became ſo faſhionable in England at one time, under the royal patronage, as to be generally adopted. Mr Chambers ſettled in England, where he gained conſiderable buſineſs as an architect, and became ſurveyor-general of the board of works, fellow of the royal and antiquarian ſocieties, treaſurer of the royal academy, and knight of the polar ſtar in Sweden. The building of Somerſet-houſe will prove a laſting monument of his ſkill and taſte; but his principal works are his ſtair-caſes, and his deſigns for interior arrangements. He died in March, 1796. He wrote a treatiſe on civil architecture, which is conſidered a valuable work.

CHAMBERSBURG, a poſt town of Pennſylvania, and the capital of Franklin county, ſeated on the E. branch of Conococheque creek. It conſiſts of one long ſtreet, in which are erected above 200 houſes, 2 preſbyterian churches, a ſtone jail, a brick court houſe, and a paper mill. It lies 151 miles W. of Philadelphia. Lon. 2. 29. W. Lat. 39. 56. N. from that city.

* *To* CHAMBLET. *v. a.* [from *camelot*. See CAMELOT.] To vary; to variegate.—Some have the veins more varied and *chambleted*; as oak, whereof wainſcot is made. *Bacon.*

CHAMBORD, or } a ci-devant royal palace
CHAMBORT, } of France, 9 miles E. of Blois. It was built by Francis II. and from the number and minuteneſs of its parts, has been compared to a houſe of cards. It ſtands in a park, 21 miles in circumference, but has no gardens. It is built of freeſtone in a Gothic ſtyle, K. Staniſlaus of Poland reſided 9 years in it, and it was the retreat of Marſhal Saxe, who died in it, A. D. 1750.

CHAMBRANEL, or } *n. ſ.* in architecture, an
CHAMBRANLE, } ornament of ſtone or wood round the 3 ſides of chimnies, doors, or windows. *Aſh.*

CHAMBRE, Martin Cureau, DE LA, phyſician to Lewis XIV. was diſtinguiſhed by his knowledge in medicine, philoſophy, and polite learning. He was born at Mons; and was received into the French academy in 1635, and afterwards into the academy of ſciences. He wrote a great number of works, the principal of which are, 1. The characters of the paſſions. 2. The art of knowing men. 3. On the knowledge of beaſts, &c. He died at Paris in 1669.

* CHAMBREL *of a Horſe*. The joint or bending of the upper part of the hinder leg. *Farrier's Dict.*

(1.) CHA.

(1.) CHAMELEON, in aſtronomy, a conſtellation of the ſouthern hemiſphere, near the S. pole, inviſible in our latitude. See ASTRONOMY, § 549.

(2.) * CHAMELEON. *n. ſ.* [Χαμαιλεων.] The *chameleon* has four feet, and on each foot three claws. Its tail is long; with this, as well as with its feet, it faſtens itſelf to the branches of trees. Its tail is flat, its noſe long, in an obtuſe point; its back is ſharp, its ſkin plaited, and jagged like a ſaw from the neck to the laſt joint of the tail, and upon its head it has ſomething like a comb; like a fiſh it has no neck. Some have aſſerted, that it lives only upon air; but it has been obſerved to feed on flies, catched with its tongue, which is about 10 inches long, and 3 thick; made of white fleſh, round, but flat at the end; or hollow and open, reſembling an elephant's trunk. It alſo ſhrinks, and grows longer. This animal is ſaid to aſſume the colour of thoſe things to which it is applied; but our modern obſervers aſſure us, that its natural colour, when at reſt and in the ſhade, is a bluiſh grey; though ſome are yellow, and others green, but both of a ſmaller kind. When it is expoſed to the ſun, the grey changes into a darker grey, inclining to dun colour, and its parts, which have leaſt of the light upon them, are changed into ſpots of different colours. The grain of its ſkin, when the light doth not ſhine upon it, is like cloth mixed with many colours. Sometimes when it is handled, it ſeems ſpeckled with dark ſpots, inclining to green. If it be put upon a black hat, it appears to be of a violet colour; and ſometimes if it be wrapped up in linen, it is white; but it changes colour only in ſome parts of the body. *Calmet.*—A *chameleon* is a creature about the bigneſs of an ordinary lizard; his head unproportionably big, and his eyes great; he moveth his head without writhing of his neck, which is inflexible, as a hog doth; his back is crooked, his ſkin ſpotted with little tumours, leſs eminent near the belly; his tail ſlender and long; on each foot he hath five fingers, three on the outſide, and two on the inſide; his tongue of a marvellous length in reſpect of his body, and hollow at the end, which he will launch out to prey upon flies; of colour green, and of a duſky yellow, brighter and whiter towards the belly; yet ſpotted with blue, white, and red. *Bacon.*

(3.) CHAMELEON, in zoology. See LACERTA.

* CHAMFER. CHAMFRET. *n. ſ.* [from *To chamfer.*] A ſmall furrow or gutter on a column.

* *To* CHAMFER. *v. a.* [*chambrer*, Fr.] To channel; to make furrows or gutters upon a column.

CHAMFERING, in architecture, a phraſe uſed for cutting any thing aſlope on the under ſide.

* CHAMFRET. See CHAMFER.

CHAMIER, Daniel, an eminent proteſtant divine, born in Dauphine. He was many years preacher at Montellimart; from whence he went in 1612 to Montaubon, to be profeſſor of divinity, and was killed by a cannon ball during the ſiege in 1621. The moſt conſiderable of his works is his *Panſtratia Catholica*, or *Wars of the Lord*, in 4 vols folio; in which he treats very learnedly of the controverſies between the Proteſtants and Roman Catholics.

* CHAMLET. *n. ſ.* [See CAMELOT.] Stuff made originally of camel's hair.—To make a *chamlet*, draw five lines, waved overthwart, if your diapering conſiſt of a double line. *Peacham.*

(1.) * CHAMOIS. *n. ſ.* [*chamois*, Fr.] An animal of the goat kind, whoſe ſkin is made into ſoft leather, called among us *ſhammy.*—Theſe are the beaſts which you ſhall eat; the ox, the ſheep, and wild ox, and the *chamois. Deut.*

(2.) CHAMOIS, in zoology. See CAPRA, N° XIV.

CHAMOIS-COURT, a village in the county of Suſſex, N. of Lewis.

(1.) * CHAMOMILE. *n. ſ.* [χαμαιμηλον.] An odoriferous plant.—For though the *chamomile*, the more it is trodden on the faſter it grows; yet youth, the more it is waſted, the ſooner it wears. *Shak.*—Poſſet drink with *chamomile* flowers. *Floyer.*

(2.) CHAMOMILE, in botany. See ANTHEMIS.

CHAMOND, a town of France, with a caſtle, in the department of Rhone and Loire, and ci-devant province of Lyonnois, ſeated on the Griez, 17 miles from Lyons, and equi-diſtant from Ville Franche. Lon. 4. 55. E. Lat. 45. 29. N.

CHAMOS, or CHEMOSH, the idol of the Moabites. The name comes from a root which, in Arabic, ſignifies to *make haſte*; for which reaſon many believe Chamos to be the ſun, whoſe precipitate courſe might well procure it the name of ſwift or ſpeedy. Others have confounded chamos with the god HAMMON, adored not only in Libya and Egypt, but alſo in Arabia, Ethiopia, and the Indies. Macrobius ſhows that Hammon was the ſun; and the horns, with which he was repreſented, denoted his rays. Calmet is of opinion, that the god Hamonus, and Apollo Chomeus, mentioned by Strabo and Ammianus Marcellinus, was the very ſame as Chamos or the ſun. Theſe deities were worſhipped in many of the eaſtern provinces. Some who go upon the reſemblance of the Hebrew term *chamos*, to that of the Greek κωμος, have believed chamos to ſignify Bacchus the god of drunkenneſs. St Jerom, and with him moſt other interpreters, take Chamos and Peor for the ſame deity. But if Baal-Peor was the ſame as Tammuz or Adonis, Chamos muſt be the god of the ſun.

CHAMOUNI, one of the elevated valleys of the Alps, ſituated at the foot of Mount Blanc. See ALPS and BLANC, N° III. § 1, 2. The firſt ſtrangers whom a curioſity to viſit the glaciers drew to Chamouni (M. Sauſſure obſerves), certainly conſidered this valley as a den of robbers; for they came armed cap-a-pee, attended with a troop of armed domeſtics: they would not venture into any houſe; they lived in tents which they brought along with them; fires were kept burning, and centinels on guard the whole night. It was in 1741, that the celebrated Engliſh travellers Pocock, and Wyndham, undertook this intereſting journey. It is remembered by the old men of Chamouni, and they ſtill laugh at the fears of the travellers, and their unneceſſary precautions. For 20 or 25 years after this period, the journey was made but ſeldom, and then chiefly by Engliſhmen, who lodged with the curate. When M. Sauſſure was there in 1760, there was only one miſerable inn or two; but now that this expedition has become ſo faſhionable, 3 large and good inns are hardly ſufficient to contain the travellers that come in ſummer from all quarters. This concourſe of ſtrangers, and the money they ſpend at Chamouni, have ſomewhat affected the ancient ſimplicity of the inhabitants. Nobody, however, has any thing to fear from them: the moſt inviolable fidelity is obſerved with reſpect to travellers; they are only expoſed to a few importunate ſolicitations, and ſome ſmall artifices, dictated by the extreme eagerneſs with which the inhabitants offer their ſervices as guides. The hope of obtaining this employment brings together, round a traveller, almoſt all the men in every village through which he paſſes, and makes him believe, that there are a great many in the valley; but there are very few at Chamouni in ſummer. Curioſity, or the hope of making money, draws many to Paris and into Germany: beſides, as the ſhepherds of Chamouni have the reputation of excelling in making cheeſe, they are in great requeſt in the Tarentaiſe, in the valley of Aoſte, and even at greater diſtances; and they receive there, for 4 or 5 months in ſummer, very conſiderable wages. Thus the labours of the field devolve almoſt entirely on the women; and even the animals of the ſame ſex are not ſpared, for the cows there are yoked in the plough. The only labours that belong excluſively to the men are the ſeeking for rock cryſtal, and the chace. Happily they are now leſs employed than formerly in the firſt of theſe occupations, for many of them periſhed in it. The hope of enriching themſelves quickly by the diſcovery of a cavern filled with fine cryſtals, was ſo powerful a motive that they expoſed themſelves in the ſearch to the moſt alarming dangers; and hardly a year paſſed without ſome of them periſhing in the ſnows, or among the precipices. But whether they conſider theſe mountains as nearly exhauſted, or that the quantity of cryſtal found at Madagaſcar has too much lowered the price of this foſſil, there are now few that go in ſearch of it, and perhaps there is not a ſingle perſon at Chamouni that makes it his only occupation. But the chace of the Chamois goat, as dangerous, and perhaps more ſo than the ſeeking for cryſtal, ſtill occupies many inhabitants of the mountains, and carries off, in the flower of their age, many men whoſe lives are moſt valuable to their families. See HUNTING. The few who have grown old in this employment bear upon their faces the marks of the life they have led. A ſavage look, ſomething in it haggard and wild, makes them be known in the midſt of a crowd, even when they are not in their hunting dreſs. And this ill look makes ſome ſuperſtitious peaſants believe that they are ſorcerers, that they have dealings with the devil in their ſolitudes, and that it is he who throws them down the rocks. In theſe countries the period is ſo ſhort between the diſſolution of the ſnow and its return, that grain has hardly time to come to maturity. M. Sauſſure mentions a very uſeful and ingenious practice, invented by the mountaineers of Argentiere, for enlarging this period; viz. ſpreading black earth upon the ſnow to accelerate its melting, and thus to anticipate, by a fortnight or three weeks, the time of labouring the fields and ſowing. The men of Chamouni, like thoſe of moſt high valleys, are neither well made nor tall; but they are nervous and ſtrong, as are alſo the women. They do not attain to a great age; men of 80 are very rare. Inflammatory diſeaſes are the moſt fatal; proceeding from obſtructed perſpiration, to which the inconſtant temperature of the climate expoſes them. They are in general honeſt, faithful, and religious. They are œconomical, but charitable. They have no hoſpitals; but orphans and old people, who have no means of ſubſiſtence, are entertained by every inhabitant of a pariſh in his turn. If a man is prevented by age or infirmities from taking charge of his affairs, his neighbours join and do it for him.

(1.) * *To* CHAMP. *v. a.* [*champayer*, Fr.] 1. To bite with a frequent action of the teeth.—Coffee and opium are taken down, tobacco but in ſmoke, and betel is but *champed* in the mouth with a little lime. *Bacon.*—

But like a proud ſteed rein'd, went haughty on,
Champing his iron curb. *Milton.*

2. To devour, with violent action of the teeth.—A tobacco pipe happened to break in my mouth, and the pieces left ſuch a delicious roughneſs on my tongue, that I *champed* up the remaining part. *Spectator.*

(2.) * *To* CHAMP. *v. n.* To perform frequently the action of biting.—Muttering and *champing*, as though his cud had troubled him, he gave occaſion to Muſidoris to come near him. *Sidney.*—They began to repent of that they had done, and irefully to *champ* upon the bit they had taken into their mouths. *Hooker.*—His jaws did not anſwer equally to one another; but by his frequent motion and *champing* with them, it was evident they were neither luxated nor fractured. *Wiſeman.*

(1.) CHAMPAGNE, a ci-devant province of France, about 162 miles long, and 112 broad. It was bounded on the N. by Hainault and Luxemburg, on the E. by Lorrain and Franche Comté, on the S. by Burgundy, and on the W. by the iſle of France and Soiſſonnois. Its principal rivers are the Meuſe, Seine, Marne, Aube, and Aine. Its chief trade conſiſts in excellent wine, all ſorts of corn, linen cloth, woollen ſtuffs, cattle, and ſheep. It was divided into the higher and lower, and and Troys was the capital. Its ſub-diviſions were Champagne Proper, Rhemois, Retelois, Pertois, Vallage, Baſigni, Senonois, and Brie Champenois. It now forms the departments of Ardennes, Aube, Marne, and Upper Marne.

(2.) CHAMPAGNE PROPER, one of the 8 ci-devant ſub-diviſions of Champagne, (N° 1.) comprehended the towns of Troys, Chalons, St Menehould, Eperney, and Vertus.

* CHAMPAIGN. *n. ſ.* [*champagne*, Fr.] A flat open country.—In the abuſes of the cuſtoms, meſeems, you have a fair *champaign* laid open to you, in which you may at large ſtretch out your diſcourſe. *Spenſer.*—

With ſhadowy foreſts and with *champaigns* rich'd,
We make thee lady. *Shak.*

CHAMPAIN, or POINT CHAMPIAN, in heraldry, a mark of diſhonour in the coat of arms of him who kills a priſoner of war, after he has cried quarter.

CHAMP DE MARS, [Fr. *i. e.* the field of Mars,] an extenſive field in Paris, which, in 1790, was fitted up in the form of an amphitheatre, capable of holding nearly a million of people, for the purpoſe of celebrating the anniverſary of the revolution, July 14, 1789.

* CHAMPERTORS. *n. ſ.* [from *champerty*. In law.] Such as move ſuits, or cauſe them to be moved, either by their own or others procurement, and purſue, at their proper coſts, to have part of the land in conteſt, or part of the gains. *Cowel.*

(1.) * CHAMPERTY. *n. ſ.* [*champert*, Fr. In law.] A maintenance of any man in his ſuit while depending, upon condition to have part of the thing when it is recovered. *Cowel.*

(2.) CHAMPERTY is a bargain with the plaintiff or defendant *campum partire*, to divide the land, or other matter ſued for between them, if they prevail at law; whereupon the champertor is to carry on the party's ſuit at his own expence. *Champert*, in the ci-devant French law, ſignified a ſimilar diviſion of profits, being a part of the crop annually due to the landlord. In our ſenſe of the word, it ſignifies the purchaſing of a ſuit, or right of ſuing; a practice ſo much abhorred by our law, that it is one main reaſon why a *choſe* in action, or thing of which one hath the right but not the poſſeſſion, is not aſſignable in common law; becauſe no man ſhould purchaſe any pretence to ſue in another's right. Theſe peſts of ſociety were ſeverally animadverted on by the Roman law; and were puniſhed by the forfeiture of a third part of their goods and perpetual infamy. And it is enacted by ſtat. 32 Hen. VIII. c. 9. that no one ſhall ſell or purchaſe any pretended right or title to land, unleſs the vender hath received the profits thereof for one whole year before ſuch grant, or hath been in actual poſſeſſion of the land, or of the reverſion or remainder; on pain that both purchaſer and vender ſhall each forfeit the value of ſuch land to the king and the proſecutor.

CHAMPIGNI, a town of France, in the department of Indre and Loire, the ci-devant province of Touraine.

* CHAMPIGNON. *n. ſ.* [*champignon*, Fr.] A kind of muſhroom.—

He viler friends with doubtful muſhrooms treats,
Secure for you, himſelf *champignons* eats. *Dryd.*

(1.) * CHAMPION. *n. ſ.* [*champion*, Fr. *campio*, low Lat.] 1. A man who undertakes a cauſe in ſingle combat.—In many armies, the matter ſhould be tried by duel between two *champions*. *Bacon.*

O light of Trojans, and ſupport of Troy,
Thy father's *champion*, and thy country's joy! *Dryden.*

2. A hero; a ſtout warriour; one bold in conteſt.

A ſtouter *champion* never handled ſword. *Shak.*

—This makes you incapable of conviction, and they applaud themſelves as zealous *champions* for truth, when indeed they are contending for errour. *Locke.* 3. In law.—In our common law, *champion* is taken no leſs for him that trieth the combat in his own caſe, than for him that fighteth in the caſe of another. *Cowel.*

(2.) CHAMPION, in the ancient ſenſe of the word, was a perſon that fought inſtead of thoſe that, by cuſtom, were obliged to accept the duel, but had a juſt excuſe for diſpenſing with it, as being too old, infirm, or being eccleſiaſtics, or the like. See BATTEL, § 2–4.

(3.) CHAMPION OF THE KING, [*campio regis*,] an ancient officer, whoſe buſineſs is, at the coronation of our kings, when the king is at dinner, to ride armed *cap-a-pee*, into Weſtminſter Hall, and by the proclamation of an herald make a challenge, "That if any man ſhall deny the king's title to the crown, he is there ready to defend it in ſingle combat, &c." which being done, the king drinks to him, and ſends him a gilt cup with a cover full of wine, which the champion drinks, and hath the cup for his fee. This office, at the coronation of king Richard II. when Baldwin Freville exhibited his petition for it, was adjudged to his competitor Sir John Dymocke, (both claiming from Marmion,) and hath continued ever ſince in the family of the Dymockes; who hold the manor of Sinvelſby in Lincolnſhire, hereditary from the Marmions by grand ſerjeantry, *viz.* that the lord thereof ſhall be the king's champion as aforeſaid. Accordingly Sir Edward Dymocke performed this office at the coronation of Charles II. and a perſon of the ſame name performed it at that of his preſent majeſty, George III.

* *To* CHAMPION. *v. a.* [from the noun.] To challenge to the combat.—

The ſeed of Banquo, kings!
Rather than ſo, come, fate, into the liſt,
And *champion* me to th' utterance. *Shakeſp.*

(1.) CHAMPLAIN, a lake of the United States of N. America, ſituated between New York and Vermont, and formerly part of the dividing line between theſe ſtates. It extends from Miſchiſchoui Bay, which is partly in Canada, to Eaſt Bay, on the S. about 122 miles in length, and varies in breadth from 2 to 14; according to Mr Joſeph Scott, author of the *United States Gazetteer*; whom, being on the ſpot, we ſuppoſe to be better informed of its extent, than moſt other geographers, who make it 42 miles ſhorter. See AMERICA, § 39. It contains above 60 iſlands of various ſizes, the chief of which are MOTE Iſland, and N. and S. HERO. It communicates on the N. with the St Laurence by the Sorel. At Ticonderago it receives the waters of lake GEORGE, from the SSW. by a fall of 100 feet in height. Its water is pure and tranſparent; generally deep enough to navigate a ſhip of 50 or 60 guns; and in ſome places from 80 to 100 fathoms. It abounds with fiſh, particularly ſturgeon; and SNAKE STONES and other curious petrifactions are found on its banks. Rock cryſtals of a fine water are got upon its iſlands. This lake was long an object of contention between the courts of Britain and France; who were anxious to ſecure the navigation of it, (as it afforded the moſt expeditious communication with Canada,) by erecting various forts on its banks. See CROWN POINT, and TICONDERAGO.

(2.) CHAMPLAIN, Samuel DE, a celebrated French navigator, the founder of Canada. He built Quebec; was the firſt governor of the colony in 1603: and died after 1649. See QUEBEC. The lake, (N° 1.) took its name from him.

(3.) CHAMPLAIN a townſhip of New York, in Clinton county, ſituate on Lake Champlain. It had 572 citizens, 76 electors, and three ſlaves, in 1796.

CHAMPTOSEAUX, a town of France, with a caſtle in the ci-devant province of Anjou.

CHAN. See KHAN.

CHANANÆI, the ancient Canaanites, inhabitants of Canaan in general, deſcendants of Canaan; but peculiarly appropriated to ſome one branch; though it is uncertain which ſon of Canaan they were deſcended from, or how it happened that they preferred the common gentilitious name to one more appropriated; unleſs from their courſe of life, as being in the mercantile way, the import of the name *Canaan;* and for which their ſituation was greatly adapted, as they lived on the ſea and about Jordan; and occupied the greateſt part of what was afterwards called Judea.

(1.) * CHANCE. *adj.* [It is ſeldom uſed but in compoſition.] Happening by chance.—

Now ſhould they part, malicious tongues would ſay,
They met like *chance* companions on the way.
Dryden.

(2.) * CHANCE. *n. ſ.* [*chance*, Fr.] 1. Fortune; the cauſe of fortuitous events.—*Chance* is but a mere name, and really nothing in itſelf; a conception of our minds, and only a compendious way of ſpeaking, whereby we would expreſs, that ſuch effects as are commonly attributed to *chance*, were verily produced by their true and proper cauſes, but without their deſign to produce them. *Bentley.* 2. Fortune; the act of fortune; what fortune may bring: applied to perſons.—Theſe things are commonly not obſerved, but left to take their *chance*. *Bacon's Eſſ.* 3. Accident; caſual occurrence; fortuitous event.—To ſay a thing is a *chance* or caſualty, as it relates to ſecond cauſes, is not profaneneſs, but a great truth; as ſignifying no more, than that there are ſome events beſides the knowledge and power of ſecond agents. *South.* 4. Event; ſucceſs; luck: applied to things.—

Now we'll together, and the *chance* of goodneſs
Be like our warranted quarrel! *Shakeſpeare.*

5. Misfortune; unlucky accident.—

You were us'd
To ſay, extremity was the trier of ſpirits,
That common *chances* common men could bear.
Shakeſpeare.

6. Poſſibility of any occurrence.—

A *chance*, but *chance* may lead, where I may meet
Some wand'ring ſpirit of heav'n, by fountain ſide,
Or in thick ſhade retir'd. *Milton's Par. Loſt.*

(3.) CHANCE, (§ 1. *def.* 1, 3.) a term we apply to events, to denote that they happen without any neceſſary or foreknown cauſe. See CAUSE, § II. and III. Our aim is, to aſcribe thoſe things to *chance*, which are not neceſſarily produced as the natural effects of any proper cauſe: but our ignorance and precipitance lead us to attribute effects to chance, which have a neceſſary and determinate cauſe. When we ſay a thing happens *by chance*, we really mean no more than that its cauſe, is unknown to us: not, as ſome vainly imagine that *chance* itſelf can be the cauſe of any thing. The caſe of the painter, who, unable to expreſs the foam at the mouth of a horſe he had painted, threw his ſponge in deſpair at the piece, and, by chance, did that which he could not before do by deſign, (ſee APELLES, N° 1.) is an eminent inſtance of the force of *chance:* yet, it is obvious, all we hear mean by *chance*, is, that the painter was not aware of the effect; or that he did not throw the ſponge with ſuch a view: not but that he actually did every thing neceſſary to produce the effect; inſomuch, that, conſidering the direction wherein he threw his ſponge, together with its form, ſpecific gravity, the colours wherewith it was ſmeared, and the diſtance of the hand from the piece, it was impoſſible, that the effect ſhould not follow.

(4.) CHANCE is frequently perſonified, and erected into a chimerical being, whom we conceive as acting arbitrarily, and producing all the effects whoſe real cauſes do not appear to us; in which ſenſe the word coincides with the τυχη, or FORTUNE, of the ancients. See § 1. *def.* 2.

(5.) CHANCE is alſo uſed for the manner of deviding things, the conduct or direction whereof is left at large, and not reducible to any determinate rules or meaſures; or where there is no ground for preference: as at cards, dice, lotteries, &c. See LOT, SORTES, and SORTILEGE.

(6.) CHANCE, LAWS OF, ſignify the proportion of hazard in gaming. See GAME.

* *To* CHANCE. *v. n.* [from the noun.] To happen; to fall out; to fortune.—

Ay, Caſca, tell us what hath *chanc'd* to-day,
That Cæſar looks ſo ſad. *Shakeſpeare.*

—He *chanced* upon divers of the Turks victuallers, whom he eaſily took. *Knolles's Hiſt. of the Turks.*

I choſe the ſafer ſea, and *chanc'd* to find
A river's mouth impervious to the wind. *Pope.*

* CHANCEABLE. *adj.* [from *chance.*] Accidental.—The trial thereof was cut off by the *chanceable* coming thither of the king of Iberia. *Sidney.*

* CHANCEFUL. *adj.* [*chance* and *ful.*] Hazardous. Out of uſe.—

Myſelf would offer you t' accompany
In this adventurous *chanceful* jeopardy. *Spenſer.*

(1.) * CHANCEL. *n. ſ.* [from *cancelli*, Lat. lettices, with which the *chancel* was incloſed.] The eaſtern part of the church, in which the altar is placed.—Whether it be allowable or no, that the miniſter ſhould ſay ſervice in the *chancel*. *Hooker.* —The *chancel* of this church is vaulted with a ſingle ſtone of 4 feet in thickneſs, and 114 in circumference. *Addiſon on Italy.*

(2.) CHANCEL is defined by Mr Chambers, to be that part of the choir of a church, between the altar and the rail that incloſes it, where the miniſter is placed at the celebration of the communion. The right of a ſeat and a ſepulchre in the chancels is one of the privileges of founders.

CHANCELLARY. See CHANCELLOR, § IV. and CHANCERY.

(I.) * CHANCELLOR. *n. ſ.* [*cancellarius*, Lat. *chancellier*, Fr. from *cancellare, literas vel ſcriptum linea per medium ducta damnare*, and ſeemeth of itſelf likewiſe to be derived *à canceilis*, which ſignify all one with κιγκλιδις, a lettice; that is, a thing made of wood or iron bars, laid croſsways one over another, ſo that a man may ſee through them in and out. It may be thought that judgement

ment ſeats were compaſſed in with bars, to defend the judges and other officers from the preſs of the multitude, and yet not to hinder any man's view.

Quæſitus regni tibi cancellarius *Augli,*
Primus ſolliciti mente petendus erit.
Hic eſt, qui regni leges cancellat iniquas ;
Et mandata pii principis æqua facit.
Verſes of *Nigel de Wetekre* to the biſhop of Ely, chancellor to Richard I.]

1. The higheſt judge of the law.—*Cancellarius,* at the firſt, ſignified the regiſters or actuaries in court; *grapharios, ſcil. qui conſcribendis & excipiendis judicum actis dant operam.* But this name is greatly advanced, and not only in other kingdoms but in this is given to him that is chief judge in cauſes of property; for the *chancellor* hath power to moderate and temper the written law, and ſubjecteth himſelf only to the law of nature and conſcience. *Cowel.*—Ariſtides was a perſon of the ſtricteſt juſtice, and beſt acquainted with the laws, as well as forms of their government; ſo that he was in a manner *chancellor* of Athens. *Swift.* 2. CHANCELLOR *in the Eccleſiaſtical Court.* A biſhop's lawyer; a man trained up in the civil and canon law, to direct the biſhops in matters of judgement, relating as well to criminal as to civil affairs in the church. *Ayliffe's Parergon.* 3. CHANCELLOR *of a Cathedral.* A dignitary, whoſe office it is to ſuperintend the regular exerciſe of devotion. 4. CHANCELLOR *of the Exchequer.* An officer who ſits in that court, and in the exchequer chamber. He has power, with others, to compound for forfeitures on penal ſtatutes, bonds and recognizances entered into by the king. He has great authority in managing the royal revenue, and in matters of firſt fruits. The court of equity is in the exchequer chamber, and is held before the lord treaſurer, *chancellor,* and barons, as that of common law before the barons only. *Cowel. Champ.* 5. CHANCELLOR *of an Univerſity.* The principal magiſtrate, who, at Oxford, holds his office during life, but, at Cambridge, he may be elected every 3 years. 6. CHANCELLOR *of the Order of the Garter,* and other military orders, is an officer who ſeals the commiſſions and mandates of the chapter and aſſembly of the knights, keeps the regiſter of their deliberation, and delivers their acts under the ſeal of the order. *Chambers.*

(II.) CHANCELLOR was at firſt only a chief notary under the emperors: and was called *cancellarius,* becauſe he ſat behind a lattice, to avoid being crowded by the people: though ſome derive the word from *conceilare,* to cancel. (See CHANCERY.) This officer was afterwards inveſted with a general ſuperintendancy over the reſt of the officers of the prince. From the Roman empire it paſſed to the Roman church, ever emulous of imperial ſtate: and hence every biſhop has to this day his chancellor. See § I. *def.* 2. And when the modern kingdoms of Europe were eſtabliſhed upon the ruins of the empire, almoſt every ſtate preſerved its chancellor with different juriſdictions and dignities, according to their conſtitutions. But in all of them he ſeems to have had the ſuperviſion of all charters, letters, and ſuch other public inſtruments of the crown as were authenticated in the moſt ſolemn manner: and therefore, when ſeals came in uſe, he had always the cuſtody of the king's great ſeal.

(III.) CHANCELLOR, LORD HIGH OF GREAT BRITAIN, or LORD KEEPER OF THE GREAT SEAL, is the higheſt honour of the long robe, being created by the mere delivery of the king's great ſeal into his cuſtody; whereby he becomes without writ or patent, an officer of the greateſt weight and power of any now ſubſiſting in the kingdom. He is a privy counſellor by his office; and, according to lord Chancellor Elleſmere, prolocutor of the houſe of lords by preſcription. To him belongs the appointment of all the juſtices of the peace throughout the kingdom. Being in former times commonly an eccleſiaſtic, (for none elſe were then capable of an office ſo converſant in writing,) and preſiding over the royal chapel, he became keeper of the king's conſcience; viſitor, in right of the king, of all hoſpitals and colleges of the king's foundation; and patron of all the king's livings under L. 20 *per annum,* in the king's book. He is the general guardian of all infants, ideots, and lunatics; and has the general ſuperintendance of all charitable inſtitutions in the kingdom. And all this over and above the vaſt extenſive juriſdiction which he exerciſes in his judicial capacity in the court of chancery. He takes precedence of every temporal lord except the royal family, and of all others except the Abp. of Canterbury. See CHANCERY.

(IV.) CHANCELLOR, LORD, OF SCOTLAND, was the chief in matters of juſtice. In the laws of K. Malcolm II. he is placed before all other officers: and from theſe it appears, that he had the principal direction of the Chancery, or CHANCELLARY as it is called, which is his proper office. He had the cuſtody of the king's ſeal; and he was the king's moſt intimate counſellor, as appears by an old law cited by Sir James Balfour: "The chancellar ſall at al tymes aſſiſt the king, in giving him counſall mair ſecretly nor the reſt of the nobility, to quais ordinances of all officiaris, als well of the realme as of the kingis hous, ſould anſwer and obey. The chancellar ſall be ludgit neir unto the kingis grace, for keiping of his bodie, and the ſeill; and that he may be readie baith day and nicht at the kingis command." By having the cuſtody of the great ſeal, he had an opportunity of examining the king's grants and other deeds which were to paſs under it, and to cancel them if they appeared againſt law, and were obtained ſurreptitiouſly or by falſe ſuggeſtions. King James VI. ordained the chancellor to have the firſt rank in the nation, *ratione officii;* by virtue whereof he preſided in parliament, and in all courts of judicature. After the reſtoration, by a particular law, the lord chancellor was declared in right of his office, preſident in all meetings of parliament, or other public judicatures of the kingdom. Although this act was made to declare the chancellor preſident of the exchequer as well as other courts, yet in 1663, the king declared the treaſurer to be preſident of this court. This office was aboliſhed by the Union, there being no farther uſe for the judicial part of it; and, to anſwer all the other parts, a lord keeper of the great ſeal was erected, with a ſalary of L. 3000 a-year.

(V.)

(V.) CHANCELLOR OF A CATHEDRAL. See § I. *def.* 3. The other parts of his office are to correct the reader when he reads amiſs; to inſpect ſchools; to hear cauſes; apply the ſeal; write the letters of the chapter; keep the books; take care that there be frequent preachings; and aſſign the office of preaching to whom he pleaſes.

(VI.) CHANCELLOR OF AN UNIVERSITY. See § I. *def.* 5. He ſhould ſeal the diplomas, or letters of degrees, proviſion, &c. given in the univerſity; but theſe things, we ſuppoſe, are done by the vice-chancellor. See N° 1 and 2.

1. CHANCELLOR OF CAMBRIDGE is uſually one of the prime nobility, and in moſt reſpects the ſame as that in Oxford, (See N° 2) only he does not hold his office for life. See § I. *def.* 5. Under the chancellor there is a commiſſary, who holds a court of record for all privileged perſons and ſcholars under the degree of M. A. where all cauſes are tried and determined by the civil and ſtatute law, and by the cuſtom of the univerſity. The vice-chancellor is choſen annually by the ſenate, out of two perſons nominated by the heads of the ſeveral colleges and halls. See N° 2.

2. CHANCELLOR OF OXFORD is uſually one of the prime nobility, choſen by the ſtudents in convocation. He is their chief magiſtrate; his office is, to govern the univerſity, preſerve and defend its rights and privileges, convoke aſſemblies, and do juſtice among the members under his juriſdiction. The vice-chancellor, is choſen annually, being nominated by the chancellor, and elected by the univerſity in convocation. He is always the head of ſome college, and in holy orders. His proper office is to execute the chancellor's power, to govern the univerſity according to her ſtatutes, to ſee that officers and ſtudents do their duty, that courts be duly called, &c. When he enters upon his office, he chooſes 4 pro-vice-chancellors out of the heads of the colleges, to execute his power in his abſence.

(VII.) CHANCELLOR OF THE DUCHY OF LANCASTER, an officer appointed chiefly to determine controverſies between the king and his tenants of the duchy land, and otherwiſe to direct all the king's affairs belonging to that court. See DUCHY COURT.

(VIII.) CHANCELLOR OF THE EXCHEQUER, preſides in that court, is always in commiſſion with the lord-treaſurer, for the letting of crown-lands, &c. See § I. *def.* 4.

(IX.) CHANCELLOR OF THE ORDER OF THE GARTER. See § I. *def.* 6.

(X.) CHANCELLOR'S COURT. See UNIVERSITY COURTS.

(XI.) CHANCELLOR, Richard, a brave Engliſh navigator, in the 16th century. He was appointed commander of one of the veſſels ſent out under Sir Hugh Willoughby, to diſcover a NW. paſſage to China, in 1553. Sebaſtian Cabot, who projected this voyage, and who was then in great favour with Edward VI. obtained letters of recommendation, in Latin, Greek, and other languages, to the ſovereigns in the NE. parts of the world; but Sir Hugh Willoughby was parted from his company, and periſhed on the coaſt of Lapland, where he had ſtopped to winter. Captain Chancellor was, however, more fortunate, and having diſcovered Ruſſia, was introduced to the grand-duke John Baſilovitz, by whom he was graciouſly received, and obtained permiſſion for the Engliſh to trade in his dominions. When he returned to England, king Edward was dead, but queen Mary was not inſenſible of the advantages held out by the diſcovery of enlarging the national commerce, and a company of adventurers was incorporated, who ſent Captain Chancellor again to Ruſſia. He was returning to England, accompanied by a Ruſſian ambaſſador and ſuite, but was unfortunately wrecked on the coaſt of Norway, where he periſhed, after exerting himſelf in the braveſt manner to ſave the Ruſſians, who arrived in London in 1557.

* CHANCELLORSHIP. *n. ſ.* The office of chancellor.—The Sunday after More gave up his *chancellorſhip* of England, he came himſelf to his wife's pew, and uſed the uſual words of his gentleman-uſher, Madam, my lord is gone. *Camden.*

(1.) * CHANCE-MEDLEY. *n. ſ.* [from *chance* and *medley.*] In law.—The caſual ſlaughter of a man, not altogether without the fault of the ſlayer, when ignorance or negligence is joined with the chance; as if a man lop trees by an highway ſide, by which many uſually travel, and caſt down a bough, not giving warning to take heed thereof, by which bough one paſſing by is ſlain: in this caſe he offends, becauſe he gave no warning that the party might have taken heed to himſelf. *Cowel.*—If ſuch an one ſhould have the ill hap, at any time, to ſtrike a man dead with a ſmart ſaying, it ought, in all reaſon and conſcience, to be judged but a *chance-medley.* *South.*

(2.) CHANCE-MEDLEY is defined by others a caſe where one is doing a lawful act, and a perſon is killed by chance thereby; for if the act be unlawful, it is felony. If a perſon caſt, not intending harm, a ſtone, which happens to hit one, whereof he dies; or ſhoots an arrow in an highway, and another that paſſeth by is killed therewith; or if a workman, in throwing down rubbiſh from a houſe after warning to take care, kills a perſon; or a ſchoolmaſter in correcting his ſcholar, a maſter his ſervant, or an officer in whipping a criminal in a reaſonable manner, happens to occaſion his death; it is chance medley and miſadventure. But if a man throw ſtones in a highway where perſons uſually paſs; or ſhoot an arrow, &c. in a market-place among a great many people; or if a workman caſt down rubbiſh from a houſe in cities and towns where people are continually paſſing; or a ſchoolmaſter, &c. correct his ſervant or ſcholar, &c. exceeding the bounds of moderation; it is manſlaughter: and if with an improper inſtrument of correction, as with a ſword or iron bar, or by kicking, ſtamping, &c. in a cruel manner, it is murder. If a man whips his horſe in a ſtreet to make him gallop, and the horſe runs over a child and kills it, it is manſlaughter: but if another whips the horſe, it is manſlaughter in him, and chance-medley in the rider. In chance-medley, the offender forfeits his goods; but hath a pardon of courſe.

CHANCERON, in natural hiſtory, a name given by the French writers to the ſmall caterpillar that eats the corn, and does vaſt miſchief in their granaries. See CORN BUTTERFLY.

(I.) * CHANCERY. *n. ſ.* [from *chancellor*; probably *chance'lery*; then ſhortened.] The court of equity and conſcience, moderating the rigour of other courts, that are tied to the letter of the law; whereof the lord chancellor of England is the chief judge, or the lord keeper of the great ſeal. *Cowel.*—The contumacy and contempt of the party muſt be ſignified in the court of *chancery*, by the biſhop's letters under the ſeal epiſcopal. *Ayliffe's Parergon.*

(II.) CHANCERY is the higheſt court of juſtice in Britain next to the parliament, and of very ancient inſtitution. It has its name chancery, *cancellaria*, from the judge who preſides here, the lord chancellor, or *cancellarius*; who, according to Sir Edward Coke, is ſo termed, *a cancellando*, from cancelling the king's letters patent when granted contrary to law, which is the higheſt point of his juriſdiction. In chancery there are two diſtinct tribunals: the one ORDINARY, being a court of common law; the other EXTRAORDINARY, being a court of equity.

1. CHANCERY, THE EXTRAORDINARY, COURT OF, proceeds by the rules of equity and conſcience; and moderates the rigour of the common law, conſidering the *intention* rather than the *words* of the law. It gives relief for and againſt infants notwithſtanding their minority, and for and againſt married women notwithſtanding their coverture. All frauds and deceits for which there is no redreſs at common law; all breaches of truſt and confidence; and accidents, as to relieve obligors, mortgagers, &c. againſt penalties and forfeitures, where the intent was to pay the debt, are here remedied: for in chancery, a forfeiture, &c. ſhall not bind, where a thing may be done after or compenſation made for it. Alſo this court gives relief againſt the extremity of unreaſonable engagements entered into without conſideration; obliges creditors that are unreaſonable to compound with an unfortunate debtor; and makes executors, &c. give ſecurity and pay intereſt for money that is to lie long in their hands. This court may confirm title to lands, though one hath through miſtake loſt his writings; and render conveyances, defective through miſtake, &c. good and perfect. In chancery, copy holders may be relieved againſt the ill-uſage of their lords; incloſures of lands that are common be decreed; and this court may decree money or lands given to charitable uſes, oblige men to account with each other, &c. But in all caſes where the plaintiff can have this remedy law, he ought not to be relieved in chancery; and a thing which may be tried by a jury is not triable in this court.

2. CHANCERY, THE ORDINARY LEGAL COURT OF, holds pleas of recognizances acknowledged in the chancery, writs of *ſcire facias*, for repeal of letters patent, writs of partition, &c. and alſo of all perſonal actions by or againſt any officer of the court. Sometimes a *ſuperſedeas*, or writ of privilege, has been granted to diſcharge a perſon out of priſon; one from hence may have a *habeas corpus* prohibition, &c. in the vacation; and here a *ſubpœna* may be had to force witneſſes to appear in other courts, when they have no power to call them. But, in proſecuting cauſes, if the parties deſcend to iſſue, this court cannot try it by jury; but the lord chancellor delivers the record into the King's Bench to be tried there; and after trial, is to be remanded into the chancery, and there judgment given: though if there be a demurrer in law, it ſhall be argued in this court. In this court is alſo kept the *officina juſtitiæ*; out of which all original writs that paſs under the great ſeal, all commiſſions of charitable uſes, ſewers, bankruptcy, idiocy, lunacy, and the like, do iſſue; and for which it is always open to the ſubject, who may there at any time demand and have, *ex debito juſtitiæ*, any writ that his occaſions may call for. Theſe writs, relating to the buſineſs of the ſubject, and the returns of them, were, according to the ſimplicity of ancient times, originally kept in *hanaperio*, in a hamper, and the others (relating to ſuch matters wherein the crown is mediately or immediately concerned) were preſerved in a little ſack or bag, *in parva bagga*: and hence aroſe the diſtinction of the *hanaper* office, and the *petty-bag* office, which both belong to the common law court in chancery.

(III.) CHANCERY, THE PROCEEDINGS IN, are, firſt to file the bill of complaint, ſigned by ſome counſel ſetting forth the fraud or injury done, or wrong ſuſtained, and praying relief: after which, proceſs of *ſubpœna*, iſſues to compel the defendant to appear; when he puts in his anſwer to the bill of complaint, if there be no cauſe for the plea to the juriſdiction of the court, in diſability of the perſon, or in bar, &c. Then the plaintiff brings his replication, unleſs he files exceptions againſt the anſwer as inſufficient, referring it to a maſter to report whether it be ſufficient or not; to which report exceptions may alſo be made. The anſwer, replication, rejoinder, &c. being ſettled, and the parties come to iſſue, witneſſes on both ſides are examined upon interrogatories, either in court or by commiſſion in the country, wherein the parties uſually join. Publication is then made of the depoſitions, and the cauſe is ſet down for hearing; after which follows the decree. But it is uſual to appeal to the houſe of lords, who either affirm or reverſe the decree of the chancery.

CHANCHA, a rich town of Africa, in Egypt, 5 miles from Cairo, at the entrance of the road to Mount Sinai.

(1.) * CHANCRE. *n.ſ.* [*chancre*, Fr.] An ulcer uſually ariſing from venereal maladies.—It is poſſible he was not well cured, and would have relapſed with a *chancre*. *Wiſeman.*

(2.) CHANCRE. See MEDICINE, *Index*.

* CHANCROUS. *adj.* [from *chancre*.] Having the qualities of a chancre; ulcerous.—You may think I am too ſtrict in giving ſo many intervals in the cure of ſo ſmall an ulcer as a chancre, or rather a *chancrous* callus. *Wiſeman.*

CHANDA, a conſiderable city of Hindooſtan, in Berar, ſubject to the chief of the Eaſtern Mahratas; ſeated on a branch of the Godavery, 70 miles S. of Nagpour. Lon. 79. 40. E. Lat. 20. 10. N.

(1.) * CHANDELIER. *n.ſ.* [*chandelier*, Fr.] A branch for candles.

(2.) CHANDELIER, in fortification, a kind of moveable parapet, conſiſting of a wooden frame, made of two upright ſtakes, about 6 feet high, with croſs planks between them; ſerving to ſupport facines to cover the pioneers.

CHANDEREE, a town of Hindooſtan, capital of a diſtrict in the Malva country, near the river Betwba. It is the reſidence of a rajah, and lies 148 miles S. of Ara. Lon. 78. 43. E. Lat. 20. 10. N.

CHANDERNAGORE, a large town of Hindooſtan Proper, in Bengal, 2½ leagues NNW. of Calcutta. It is hardly a league in circumference, and has the diſadvantage of being ſomewhat expoſed on the weſtern ſide; but its harbour is excellent, and the air is as pure as it can be on the banks of the Ganges. When any building is undertaken that requires ſtrength, it muſt here, as in all other parts of Bengal, be built upon piles; it being impoſſible to dig 3 or 4 feet without coming at water. It was originally a French ſettlement and had a very ſtrong fort, which was taken and deſtroyed by admiral Watſon in 1757; and, in 1793, the Britiſh again diſpoſſeſſed the French of this ſettlement. It is ſeated on the W. ſide of the river Hoogly.

(1.) * CHANDLER. *n.ſ.* [*chand lier*, Fr.] An artiſan whoſe trade it is to make candles, or a perſon who ſells them.—The ſack that thou haſt drunken me, would have brought me lights as good and cheap at the deareſt *chandler's* in Europe. *Shakeſpeare.*

(2.) **CHANDLER**, Edward, biſhop of Durham, was educated at Emanuel college, Cambridge. In 1693, he became chaplain to Dr Lloyd, biſhop of Litchfield and Coventry; and in 1717 he was made biſhop of the ſame dioceſe. In 1730 he was tranſlated to Durham, and died in 1750, aged about 80. He was a man of conſiderable learning, and beſides publiſhing various ſingle ſermons, diſtinguiſhed himſelf by his "Defence of Chriſtianity from the prophecies of the Old Teſtament, wherein are conſidered all the objections againſt this kind of proof, advanced in a late Diſcourſe of of the Grounds and Reaſons of the Chriſtian Religion," which has gone through three editions. He alſo wrote a Chronological Diſſertation prefixed to Arnold's Commentary on Eccleſiaſticus; and a curious biographical Preface to Dr Cudworth's Treatiſe on Morality.

(3.) **CHANDLER**, Mary, the daughter of a diſſenting miniſter at Bath, was born at Malmſbury in Wiltſhire, in 1687. She was bred a milliner, but from her childhood had a turn for poetry, and in her riper years became diſtinguiſhed by her poetical talents. Her poems, for which ſhe was complimented by Mr Pope, breathe the ſpirit of piety and philoſophy. She had the misfortune to be deformed, which determined her to live ſingle; though ſhe had great ſweetneſs of countenance, and was ſolicited to marry. She died in 1745, aged 58.

(4.) **CHANDLER**, Samuel, D. D. a learned and reſpectable diſſenting miniſter, deſcended from anceſtors heartily engaged in the cauſe of religious liberty, and ſufferers for the ſake of conſcience and nonconformity; was born at Hungerford in Berks, where his father was a miniſter of conſiderable worth and abilities. Being deſtined to the miniſtry, he was next placed at an academy at Bridgewater, and thence removed to Glouceſter, under Mr Samuel Jones; among whoſe pupils were Joſeph Butler, afterwards bp. of Durham, and Thomas Secker, afterwards abp. of Canterbury. With theſe eminent perſons he contracted a friendſhip that continued to the end of their lives, notwithſtanding the different views by which their conduct was afterwards directed. Mr Chandler began to preach in 1714; and, being ſoon diſtinguiſhed by his talents, was choſen, in 1716, miniſter of the Preſbyterian congregation at Peckham near London, where he continued ſome years. Here he married, and began to have an increaſing family, when by the fatal South-ſea ſcheme of 1720, he loſt the whole fortune he had received with his wife. His circumſtances being thereby embarraſſed, he engaged in the trade of a bookſeller, and kept a ſhop in London, for 2 or 3 years, ſtill continuing to diſcharge the duties of the paſtoral office. He alſo officiated as joint preacher with the learned Dr Lardner, at the meeting-houſe in Old Jewry, London: in which he afterwards ſucceeded as ſole paſtor. While he was thus laudably employed, the univerſities of Edinburgh and Aberdeen conferred on him the degree of D. D. unſolicited. He alſo received offers of preferment in the eſtabliſhed church, which he nobly declined. He was afterwards elected F. R. and A. SS. On the death of George II. in 1760, Dr Chandler publiſhed a ſermon on that event, in which he compared that prince to K. David. This gave riſe to a pamphlet, which was printed in 1761, entitled "The Hiſtory of the Man after God's own Heart;" wherein the author exhibited David as an example of perfidy, luſt, and cruelty, fit only to be ranked with a Nero or a Caligula; and complained of the inſult that had been offered to the memory of the late Britiſh monarch, by Dr Chandler's parallel between him and the king of Iſrael. This attack occaſioned Dr Chandler to publiſh, in 1762, "A Review of the hiſtory of the Man after God's own heart; in which the Falſehoods and Miſrepreſentations of the Hiſtorian are expoſed and corrected." He alſo prepared for the preſs a more elaborate work, afterwards publiſhed in two vols. 8vo. entitled, "A Critical Hiſtory of the Life of David; in which the principal Events are ranged in Order of time; the chief Objections of Mr Bayle and others againſt the character of this Prince, and the Scripture Account of him, and the Occurrences of his Reign, are examined and refuted; and the Pſalms which refer to him explained." As this was the laſt, it was likewiſe one of the beſt, of Dr Chandler's productions. The greateſt part of this work was printed off at the time of his death, which happened May 8th 1766, aged 73. He was a man of very extenſive learning and eminent abillities; his apprehenſion was quick and his judgment penetrating; he had a warm and vigorous imagination; he was a very inſtructive and animated preacher; and his talents procured him very general eſteem, not only among the diſſenters, but among great numbers of the eſtabliſhed church. He was principally inſtrumental in the eſtabliſhment of the fund for relieving the widows and orphans of poor Proteſtant diſſenting miniſters: He firſt formed the plan of it, and by his intereſt many of the ſubſcriptions for its ſupport were procured. In 1768, four volumes of his ſermons were publiſhed by Dr Amory; and, in 1777, was publiſhed in 4to. his "Paraphraſe and Notes on the Epiſtles of St Paul to the Galations and Epheſians, with a critical and practical Commentary on the two Epiſtles of St Paul to the Theſſalonians." Dr Chandler alſo wrote, "A vindication of the Chriſtian Religion;" "Reflections on the conduct of the Modern Deiſts, in their late Writings againſt Chriſtianity;" "A Vindication of the Antiquity and Authority of Daniel's Prophecies, and their Application to Jeſus Chriſt;" and, "The Hiſtory of Perſecution."

CHANDOSE, a town SW. of Hempſted, Herts.

* CHANFRIN. *n. ſ.* [old French.] The forepart of the head of a horſe, which extends from under the ears, along the interval between the eyebrows, down to his noſe. *Farrier's Dict.*

(1.) CHANGANOR, a territory of Hindooſtan, in Malabar.

(2.) CHANGANOR, the capital of the above diſtrict, N° 1.

(1.) * CHANGE. *n. ſ.* [from the verb.] 1. An alteration of the ſtate of any thing.—

Since I ſaw you laſt,
There is a *change* upon you. *Shakeſpeare.*

2. A ſucceſſion of one thing in the place of another.—

O wond'rous *changes* of a fatal ſcene,
Still varying to the laſt! *Dryden.*

3. The time of the moon in which it begins a new monthly revolution.—Take ſeed or roots, and ſet ſome of them immedialtely after the *change*, and others of the ſame kind immediately after the full. *Bacon's Nat. Hiſt.* 4. Novelty; a ſtate different from the former.—

Our fathers did, for *change* to France repair,
And they for *change*, will try our Engliſh air.
Dryden.

5. [In ringing.] An alteration of the order in which a ſet of bells is ſounded.—Four bells admit 24 *changes* in ringing, and five bells 120. *Holder's Elements of Speech.*—Eaſy it may be to contrive new poſtures, and ring other *changes* upon the ſame bells. *Norris.* 6. That which makes a variety; that which may be uſed for another of the ſame kind.—I will now put forth a riddle unto you; if you can find it out, then I will give you 30 ſheets, and 30 *change* of garments. *Judges.* 7. Small money, which may be given for larger pieces.—Wood buys up our old halfpence, and from thence the preſent want of *change* ariſes; but ſuppoſing not one farthing of *change* in the nation, L 25,000 would be ſufficient. *Swift.* 8. Change for exchange; a place where perſons meet to traffick and tranſact mercantile affairs.—The bar the bench, the *change*, the ſchools and pulpits are full of quacks, jugglers, and plagiaries. *L'Eſtrange.*

(2.) CHANGES, in arithmetic, the permutations or variations of any number of things, with regard to their poſition, order, &c. as how many changes may be rung on a number of bells; how many different ways any number of perſons may be placed; how many variations may be made of any number of letters, or any other things propoſed to be varied. See COMBINATION. To find out ſuch number of changes, multiply continually together all the terms in a ſeries of arithmetical progreſſion, whoſe firſt term and common difference are each unity or 1, and the laſt term the number of things propoſed to be varied, thus, $1 \times 2 \times 3 \times 4 \times 5$, &c. till the laſt number be the propoſed number of things. For if there be only 2 things, as *a* and *b*, they admit of a double order or poſition only; as they can only be placed either thus *ab*, or thus, *ba*; for 1×2 is only $= 2$. But if there be three things, as *a*, *b*, and *c*, they will admit of 6 variations, as in the margin, and no more; for $1 \times 2 \times 3 = 6$. There each of the three may be combined three different ways with each of the other two. And if there be 4 things each of them may be combined 4 ways with each order of the other 3; that is 4 times 6 ways; for $1 \times 2 \times 3 \times 4 = 14$ ways. In like manner, the combinations of 5 things are $1 \times 2 \times 3 \times 4 \times 5 = 120$; and of 6 things, $1 \times 2 \times 3 \times 4 \times 5 \times 6 = 720$, &c. So that if it be aſked, How many different ways a company of 6 perſons may be placed, at table for inſtance, the anſwer will be 720 ways: But if only one perſon is added to this ſmall company, the various ways in which they may be placed will amount to 5040: And if the company be increaſed to 13 perſons, the poſſible variations in ranking them will amount to the aſtoniſhing number of 6,227,020,800 different ways. This may give ſome idea of the incredible (we had almoſt ſaid *infinite*) number of poſſible combinations of the 24 letters of the alphabet: And it affords a hint to ſuch as are fond of amuſing themſelves with making ANAGRAMS, of the eaſy manner in which all the poſſible changes may be found of any word in any language.

a	*b*	*c*
a	*c*	*b*
b	*a*	*c*
b	*c*	*a*
c	*a*	*b*
c	*b*	*a*

(1.) * *To* CHANGE. *v. a.* [*changer*, Fr. *cambio*, Lat.] 1. To put one thing in the place of another.—He that cannot look into his own eſtate, had need chooſe well whom he employeth, and *change* them often; for new are more timorous, and leſs ſubtile. *Bacon's Eſſays.* 2. To quit any thing for the ſake of another: with *for* before the thing taken or received.—Perſons grown up in the belief of any religion cannot *change* that *for* another, without applying their underſtanding duly to conſider and compare both. *South.*—

The French and we ſtill *change*; but here's
the curſe,
They *chang for* better, and we *change for* worſe.
Dryden.

3. To give and take reciprocally; with the particle *with* before the perſon to whom we give and from whom we take.—To ſecure thy content look upon thoſe thouſands, *with* whom thou wouldſt not, for any intereſt, *change* thy fortune and condition. *Taylor's Rule of living Holy.* 4. To alter; to make other than it was.—

Thou ſhalt not ſee me bluſh,
Nor *change* my countenance for this arreſt;
A heart unſpotted is not eaſily daunted. *Shak.*

5. To mend the diſpoſition or mind.—

I would ſhe were in heaven, ſo ſhe could
Intreat ſome pow'r to *change* this curriſh Jew
Shakeſpeare.

6. To diſcount a larger piece of money into ſeveral ſmaller.—A ſhopkeeper might be able to *change* a guinea, or a moidore, when a cuſtomer comes for a crown's worth of goods. *Swift.* 7. *To change a horſe*, or *to change hand*, is to turn or bear the horſes head from one hand to the other, from the left to the right, or from the right to the left. *Farrier's Dict.*

(2.) * *To* CHANGE. *v. n.* 1. To undergo change to ſuffer alteration: as, his fortune may ſoon *change*, though he is now ſo ſecure.—

One Julia, that his *changing* thought forgot,
Would better fit his chamber. *Shakeſpeare.*

3. To change as the moon: to begin a new monthly revolution.—I am weary of this moon; would he would *change*. *Shakeſpeare.*

* CHANGEABLE. *adj.* [from *change*.] 1. Subject to change; fickle; inconſtant.—A ſteady mind will admit ſteady methods and counſels; there is no meaſure to be taken of a *changeable* humour. *L'Eſtrange.* 2. Poſſible to be changed.—The fibrous or vaſcular parts of vegetables ſeem ſcarce *changeable* in the alimentary duct. *Arbuth.* 3. Having the quality of exhibiting different appearances.—Now the taylor make thy doublet of *changeable* taffata; for thy mind is very opal. *Shakeſpeare.*

* CHANGEABLENESS. *n. ſ.* [from *changeable*.] 1. Inconſtancy; fickelneſs.—There is no temper of mind more unmanly than that *changeableneſs* with which we are too juſtly branded by all our neighbours. *Addiſon.* 2. Suſceptibility of change. If how long they are to continue in force, be no where expreſſed, than we have no light to direct our judgment concerning, the *changeabelenſs* or immutability of them, but conſidering the nature and quality of ſuch laws. *Hooker.*

* CHANGEABLY. *adv.* [from *changeable*.] Inconſtantly.

* CHANGEFUL. *adj.* [from *change* and *full*.] Full of change; inconſtant; uncertain; mutable; ſubject to variation; fickle.—

Britain, *changeful* as a child at play,
Now calls in princes, and now turns away. *Pope.*

* CHANGELING. *n. ſ.* [from *change*; the word ariſes from an odd ſuperſtitious opinion, that the faries ſteal away children, and put others that are ugly and ſtupid in their places.] 1. A child left or taken in the place of another.—

And her baſe elfin breed there for thee left:
Such men do *changelings* call, ſo chang'd by faries theft. *Spenſer's Fairy Queen.*

2. An idiot; a fool; a natural.—

Changelings and fools of heav'n, and thence ſhut out,
Wildly we roam in diſcontent about. *Dryden.*

3. One apt to change; a waverer.—

Of fickle *changelings* and poor diſcontents
That gape and rub the elbow at the news
Of hurly-burly innovation, *Shakeſpeare.*

4. Any thing changed and put in the place of another: in ludicrous ſpeech.—

I folded the writ up in form of the other,
Subſcrib'd it, gave the impreſſion, plac'd it ſafely,
The *changeling* never known. *Shakeſpeare.*

(1.) * CHANGER. *n. ſ.* [from *change*.] One that is employed in changing or diſcounting money; money-changer.

(2.) CHANGER, an officer belonging to the king's mint. See MINT, and MONEY-CHANGER.

CHANG-HAI, a town of China, in the province of Kiang-nan. In this town and the villages dependent on it, are more than 200,000 weavers of cotton cloth. It is 18 miles SE. of Song Kiang.

CHANGTON, a town NW. of Stening, Suſſex.

CHANG-TONG, a province of China, bounded on the E. by Petcheli and part of Honan, on the S. by Kiang-nan, on the W. by the ſea, and on the N. by the ſea and part of Petcheli. The country is well watered by lakes, ſtreams, and rivers; but is liable to ſuffer from drought, as rain falls but ſeldom. The locuſts alſo ſometimes make great devaſtation. However, there is perhaps no country where quails, partridges, and pheaſants, are ſold cheaper, the inhabitants of this province being reckoned the keeneſt ſportſmen in the empire. It is greatly enriched by the river Yun, called the *Grand Imperial Canal*, through which all the barks bound to Pekin muſt paſs in their way thither. The duties on this canal alone amount to more than 450,000 l. annually. The canal itſelf is greatly admired by European travellers on account of its ſtrong and long dikes, the banks decorated with cut ſtone, the ingenious mechaniſm of its locks, and the great number of natural obſtacles which have been overcome in the execution of the work.—The province produces ſilk of the ordinary kind, beſides another kind from an inſect reſembling our caterpillar. It is coarſer than the ordinary ſilk, but much ſtronger and more durable; ſo that the ſtuffs made from it have a very extenſive ſale throughout the empire. The province is divided into ſix diſtricts, which contain ſix cities of the firſt claſs, and 114 of the ſecond and third. Along the coaſt, alſo, are 15 or 16 villages of conſiderable importance on account of their commerce; there are likewiſe a number of ſmall iſlands, moſt of which have harbours very convenient for the Chineſe junks which paſs from thence to Corea or Leatong. The moſt remarkable cities are, TSI-NAN-FOU, the capital, Yen-tcheu-fou, and Lin-tcin-tcheu; to which we may add Kio-feou, the birth-place of the celebrated CONFUCIUS.

CHANMANNING, a city of Aſia, in Thibet, formerly the reſidence of the Grand Lama. It is about 130 miles W. of Laſſa. Lon. 89. 45. E. Lat. 31. 0. N.

CHANNA, in ichthyology, the name of a fiſh caught in great plenty in the Mediterranean, and brought to market in Italy and elſewhere, among the ſea-perch, which it ſo nearly reſembles, that it would not be diſtinguiſhable, but that the ſea-perch is bigger, and has only broad tranſverſe lines on its back, whereas the channa has them both tranſverſe and longitudinal. It has a very wide mouth, and its lower jaw is longer than its upper; ſo that its mouth naturally falls open. Its eyes are ſmall, and its teeth very ſharp: its back is of a blackiſh red; it has ſeveral longitudinal lines of a reddiſh hue, and its tail is marked with reddiſh ſpots. There is an obſervation, as old as the days of Ariſtotle, that in all the fiſh of this kind, which have been examined by naturaliſts, there have been found none but females. Whether this be true in fact, would require many obſervations. If it ſhould prove ſo, the whole ſeems to end in this that the channa is no diſtinct ſpecies, but only the female of ſome other fiſh.

CHANNADELIA, or CANNADELLA, a fiſh reſembling the CHANNA, which at Marſeilles is known by the name of CHARINA.

(1.)* CHANNEL. *n. ſ. canal*, Fr. *canalis*, Lat.] 1. The hollow bed of running waters.—It is not ſo eaſy, now that things are grown into an habit, and have their certain courſe, to change the *channel*, and turn their ſtreams another way. *Spenſer.*—The tops of mountains and hills will be continually waſhed down by the rains, and the *channel* of rivers abraded by the ſtreams. *Bentley.* 2. Any cavity drawn longways.—

Complaint and hot deſires, the lover's hell,
And ſcalding tears, that wore a *channel* where
they fell. *Dryden's Fables.*

3. A ſtrait or narrow ſea, between two countries as the Britiſh *Channel* between Britain and France; St George's *Channel* between Britain and Ireland. 4. A gutter or furrow of a pillar.

(2.) CHANNEL, or LA MANCHE, a department of France, bounded by the Ocean on the W. by the Britiſh Channel on the N. and part of the E. by the department of Ille and Vilaine on the S. and by thoſe of Mayenne, Orne, and Calvados on the SE. and E. It comprehends part of the ci-devant province of Normandy.

(3.) CHANNEL, BRITISH. } See § 1. *def.* 3.
(4.) CHANNEL, ST GEORGE'S }

(5.) CHANNELS OF A SHIP. See CHAIN-WALES.

* *To* CHANNEL. *v. a.* [from the noun.] To cut any thing in channels.—The body of this column is perpetually *channelled*, like a thick plaited gown. *Wotton's Architecture.*

CHANNELKIRK, anciently CHINGELKIRK, a pariſh of Scotland, in Berwickſhire, 6 miles long and 5½ broad. Its form is nearly circular; its ſurface hilly, and climate remarkably healthy; though for 6 months of the year, extremely cold. Agriculture is much improved: near 2000 acres are in tillage, and produce oats, turnips, barley, clover, and potatoes. The population, in 1801, was 640.

CHANNERY, or CHANONRY, } a village of Scotland, in Roſs-ſhire, near the Murray Frith, 30 miles W. of Elgin, containing above 450 inhabitants.

CHAN-SI, a province of China, and one of the ſmalleſt in the empire, is bounded on the E. by Petcheli, on the S. by Honan, on the W. by Chen-ſi, and on the N. by the great wall. The climate is ſalubrious and agreeable, and the ſoil generally fertile, though the country is full of mountains. Some of theſe are rough, wild, and uninhabited; but others are cultivated with the greateſt care from top to bottom, and cut into terraces, forming a very agreeable proſpect; while ſome have on their tops vaſt plains no leſs fertile than the richeſt low-lands. They abound with coal, which the inhabitants pound and make into cakes with water; a kind of fuel which, though not very inflammable, affords a ſtrong and laſting heat when once kindled. It is principally uſed for heating their ſtoves, which are conſtructed with brick; but the inhabitants give them the form of ſmall beds, and ſleep upon them. The beſt grapes to be met with in this part of Aſia grow in Chan-ſi; ſo that good wine might be made, but the people chooſe rather to dry and ſell them to the neighbouring provinces. The country abounds with muſk, porphyry, marble, lapis lazuli, and jaſper of various colours; and iron mines as well as ſalt pits and cryſtal are very common. Here are 5 cities of the firſt claſs, and 85 of the ſecond and third: the principal are TAI-YOUEN FOU the capital, Ngan-y, Fuen-tcheou-fou, and Tai-tong-fou.

(I.) * CHANT. *n. ſ.* [from the verb.] Song; melody.—

A pleaſant grove,
With *chant* of tuneful birds reſounding loud.
Milton.

(II.) CHANT, [*cantus*,] is particularly uſed for the vocal muſic of churches. In church hiſtory we meet with divers kinds of theſe; ſuch as,

1. CHANT, AMBROSIAN, eſtabliſhed by St Ambroſe.

2. CHANT, GREGORIAN, introduced by Pope Gregory the Great, who eſtabliſhed ſchools of chantors, and corrected the church muſic. This at firſt was called the *Roman ſong*; afterwards the *plain* ſong; as the choir and people ſing in uniſon.

(1.) * *To* CHANT. *v. a.* [*chanter*, Fr.] 1. To ſing.

Wherein the cheerful birds of ſundry kind
Do *chant* ſweet muſick. *Fairy Queen.*

2. To celebrate by ſong.—The poets *chant* it in the theatres, the ſhepherds in the mountains. *Bramhall.* 3. To ſing in the cathedral ſervice.

(1.) * *To* CHANT. *v. n.* To ſing; to make melody with the voice.—They *chant* to the ſound of the viol, and invent to themſelves inſtruments of muſick. *Amos.* vi. 7.

(1.) * CHANTER. *n ſ.* [from *chant.*] A ſinger; a ſongſter.—

You curious *chanters* of the wood,
That warble forth dame Nature's lays. *Wotton.*

(2.) CHANTER. See BAG-PIPE, § 2.

* CHANTICLEER. *n. ſ.* [from *chanter* and *clair*, Fr.] The name given to the cock, from the clearneſs and loudneſs of his crow.—

And cheerful *chanticleer*, with his note ſhrill,
Had warned once, that Phœbus's fiery car
In haſte was climbing up the eaſtern hill. *Spenſ.*

CHANTILLY, a town of France, in the department of Seine and Oiſe, 17 miles from Paris. It has a foreſt and magnificent hunting ſeat, that belonged, before the revolution, to the ci-devant Prince of Conde. Lon. 2. 36. E. Lat. 49. 11. N.

CHANTMERLES, a village in Dorſetſhire, SE. of Everſhot.

CHANTOR, a ſinger of a choir in a cathedral, The word is almoſt grown obſolete, *choriſter* or *ſinging man* being commonly uſed inſtead of it. All great chapters have chantors and chaplains to aſſiſt the canons, and officiate in their abſence. Chantor is uſed by way of eminence for the precentor or maſter of the choir, which is one of the firſt dignities of the chapter. At St David's in Wales, where there is no dean, he is next in dignity to the biſhop. The ancients called the chantor *primicerius cantorum*. To him belonged the direction of the deacons and other inferior officers.

* CHANTRESS. *n. ſ.* [from *chant.*] A woman ſinger.—

Sweet bird, that ſhunn'ſt the noiſe of folly,
Moſt muſical, moſt melancholy,

Thee, *chantreſs* of the woods among,
I woo to hear thy even-ſong. *Milton.*

(1.) * CHANTRY. *n. ſ.* [from *chant.*] *Chantry* is a church or chapel endowed with lands, or other yearly revenue, for the maintenance of one or more prieſts, daily to ſing maſs for the ſouls of the donors, and ſuch others as they appoint. *Cowel.*

Now go with me, and with this holy man,
Into the *chantry* by;
And, underneath that conſecrated roof,
Plight me the full aſſurance of your faith. *Shak.*

(2.) Chantry rents are paid to the crown by the tenants or purchaſers of *chauntry lands.*

CHAOASES, an order of horſe, in the ſervice of the Grand Signior, who always go out with the Baſhaw.

CHAOLOGY, the hiſtory or deſcription of the chaos. See Chaos, § 2. Orpheus, in his chaology, ſets forth the different alterations, ſecretions, and divers forms which matter went through till it became inhabitable, which amounts to the ſame with what we otherwiſe call *coſmogony.* Dr Burnet, in his theory of the earth, repreſents the chaos as at firſt, entire, undivided, and univerſally rude and deformed; then ſhows how it came to be divided into its reſpective regions; how the homogeneous matter gathered itſelf apart from all of a contrary principle; and laſtly, how it hardened, and became a ſolid habitable globle. See Earth.

CHAOMANTIA, the art of making preſages from obſervations on the air.

(1.) * CHAOS. *n. ſ.* [*chaos,* Lat. χαος.] 1. The maſs of matter ſuppoſed to be in confuſion before it was divided by the creation into its proper claſſes and elements.—The whole univerſe would have been a confuſed *chaos,* without beauty or order. *Bentley.* 2. Confuſion; irregular mixture.—

Their reaſon ſleeps, but mimick fancy wakes,
Supplies her parts, and wild ideas takes
From words and things, ill ſorted, and miſjon'd,
The anarchy of thought, and *chaos* of the mind.
Dryden.

3. Any thing where the parts are undiſtinguiſhed. —We ſhall have nothing but darkneſs and a *chaos* within, whatever order and light there be in things without us. *Locke.*

(2.) Chaos, (§ 1. *def.* 1.) See Earth. Chaos is repreſented by the ancients as the firſt principle, ovum, or ſeed of nature and the world. All the ſophiſts, ſages, naturaliſts, philoſophers, theologues, and poets, held that chaos was the eldeſt and firſt principle, το αρχαιον χαος. The Barbarians, Phœnicians, Egyptians, Perſians, &c. all refer the origin of the world to a rude, mixed, confuſed maſs of matter. The Greeks, Orpheus, Heſiod, Menander, Ariſtophanes, Euripides, and the writers of the Cyclic Poems, all ſpeak of the firſt chaos: the Ionic and Platonic philoſophers build the world out of it. The Stoics hold, that as the world was firſt made of a chaos, it ſhall at laſt be reduced to a chaos; and that its periods and revolutions in the mean time are only tranſitions, from one chaos to another. Laſtly, the Latins, as Ennius, Varro, Ovid, Lucretius, Statius, &c. are all of the ſame opinion. Nor is there any ſect or nation whatever, that does not derive the διακοσμησις, *te ſtructure of the world,* from a chaos. Dr Burnet obſerves, that beſides Ariſtotle and a few other Pſeudo Pythagoreans, nobody ever aſſerted that our world was always from eternity of the ſame nature, form, and ſtructure, as at preſent; but that it had been the ſtanding opinion of the wiſe men of all ages, that what we now call the *terreſtrial globe,* was originally an unformed, indigeſted maſs of heterogeneous matter, called *chaos;* and only the rudiments and materials of the preſent world. It does not appear who firſt broached the notion of a chaos. Moſes, the earlieſt of all writers, derives the origin of this world from a confuſion of matter, dark, void, deep, without form, which he calls Tohu Bohu; which is preciſely the chaos of the Greeks and Barbarian philoſophers. Moſes goes no farther than the chaos; nor tells us whence it took its origin, or whence its confuſed ſtate; and where Moſes ſtops, there, preciſely, do all the reſt. Dr Burnet endeavours to ſhow, that as the ancient philoſophers, &c. who wrote of the coſmogony, acknowledged a chaos for the principle of their world; ſo the divines, or writers of the theogony, derive the origin or generation of their fabled gods from the ſame principle. Mr Whiſton ſuppoſes the ancient chaos, the origin of our earth, to have been the atmoſphere of a comet; which, all things conſidered, is not the moſt improbable opinion. He endeavours to make it out by many argumens, drawn from the agreement which appears to be between them. According to him every planet is a comet, formed into a regular conſtitution, and placed at a proper diſtance from the ſun, revolving in a nearly circular orbit: and a comet is a planet either beginning to be deſtroyed or remade; that is, a chaos or planet unformed, or in its primæval ſtate, and placed as yet in an orbit very eccentrical.

(3.) Chaos, in entomology, a genus of inſects belonging to the order of vermes zoophyta. The body has no ſhell or covering. It is capable of reviving after being dead to appearance for a long time, but has no joints or external organs of ſenſation. There are 5 ſpecies, moſtly obtained by infuſions of different vegetables in water, and only diſcoverable by the microſcope. See Animalcule, § 5.

* CHAOTICK. *adj.* [from *chaos.*] Reſembling chaos; confuſed.—When the terraqueous globle was in a *chaotick* ſtate, and the earthy particles ſubſided, then thoſe ſeveral beds were, in all probability, repoſited in the earth. *Derham.*

CHAOURCE, a town of France, in the ci-devant province of Champagne.

CHAOURI, a Perſian coin. See Abagi.

(1.) * CHAP. *n. ſ.* [from the verb.] A cleft; an aperture; an opening; a gaping; a chink.—What moiſture the heat of the ſummer ſucks out of the earth, it is repaid in the rains of the next winter; and what *chaps* are made in it, are filled up again. *Burnet's Theory.*

(2.) * Chap. *n. ſ.* [This is not often uſed, except by anatomiſts, in the *ſingular.*] The upper or under part of a beaſt's mouth.—

Froth fills his *chaps,* he ſends a grunting ſound,
And part he churns, and part befoams the ground.
Dryden.

—The nether *chap* in the male ſkeleton is half an inch broader than in the female. *Grew's Muſæum.*

* *To* Chap. *v. a.* [*kappen*, Dutch, to cut. This word ſeems originally the ſame with *chap*; nor were they probably diſtinguiſhed at firſt, otherwiſe than by accident; but they have now a meaning ſomewhat different, though referable to the ſame original ſenſe.] To break into *hiatus*, or gapings.—It weakened more and more the arch of the earth, drying it immoderately, and *chapping* it in ſundry places. *Burnet.*—

Then would unbalanc'd heat licentious reign,
Crack the dry hill, and *chap* the ruſſet plain.
Blackmore.

CHAPARANG. See Dsaprong.

* CHAPE. *n. ſ.* [*chappe*, Fr.] 1. The catch of any thing by which it is held in its place; as the hook of a ſcabbard by which it ſticks in the belt; the point by which a buckle is held to the back ſtrap.—This is Monſieur Parolles, that had the whole theory of the war in the knot of his ſcarf, and the practice in the *chape* of his dagger. *Shakeſpeare.* 2. A braſs or ſilver tip or caſe, that ſtrengthens the end of the ſcabbard of a ſword. *Philip's World of Words.*

CHAPEAU, in heraldry, an ancient cap of dignity worn by dukes, being ſcarlet-coloured velvet on the outſide, and lined with a fur. It is frequently born above an helmet inſtead of a wreath, under gentlemen's creſts.

(I.) * CHAPEL. *n. ſ.* [*cappella*, Lat.] A *chapel* is of two ſorts, either adjoining to a church, as a parcel of the ſame, which men of worth build, or elſe ſeparate from the mother church, where the pariſh is wide, and is commonly called a *chapel* of eaſe, becauſe it is built for the eaſe of one or more pariſhioners, that dewll too far from the church, and is ſerved by ſome inferiour curate, provided for at the charge of the rector, or of ſuch as have benefit by it, as the compoſition or cuſtom is. *Cowel.*—She went in among thoſe few trees, ſo cloſed in the tops together, as they might ſeem a little *chapel. Sidney.*—A free *chapel* is ſuch as is founded by the king of England. *Ayliffe.*

(III.) Chapel is alſo a name given to a printer's work-houſe; ſome ſay, becauſe printing was firſt actually performed in chapels; others, becauſe Caxton, an early printer, exerciſed the art in one of the chapels in Weſtminſter Abbey.

(III.) Chapel, in geography, the name of 7 Engliſh villages; viz. 1. in Eſſex, NE. of Cogges hall; 2. in Kent, near Limme: 3. in Monmouthſhire: 4. in Surrey, SW. of Newdigate: 5. New, in Shropſhire, 2 miles SE. of Chin Caſtle: 6. New, in Surry, in Burſtow pariſh: and, 7. North, in Suſſex, near Blackdown Beacon.

(IV.) Chapel, knights of the. See Windsor.

(V.) Chapels, British. See § I. In Britain there are ſeveral ſorts of chapels, viz.

1. Chapels, domestic, built by noblemen or gentlemen for private worſhip in their families. See Chaplain.

2. Chapels, free, ſuch as were founded by kings of England. They are free from all epiſcopal juriſdiction, and only to be viſited by the founder and his ſucceſſors; which is done by the lord chancellor: yet the king may licenſe any ſubject to build and endow a chapel, and by letters patent exempt it from the viſitation of the ordinary.

3. Chapels in universities, belonging to particular univerſities.

4. Chapels of ease. See § I, *def.* 2.

5. Chapels, parochial, differ from pariſh churches only in name; they are generally ſmall, and the inhabitants within the diſtrict few. If there be a preſentation *ad eccleſiam*, inſtead of *capellam*, and an admiſſion and inſtitution upon it, it is no longer a chapel, but a church.

CHAPELAIN, James, an eminent French poet born at Paris in 1595, and often mentioned in the works of Balzac, Menage, and others. He wrote ſeveral works, particularly, an heroic poem, called *La Pucelle, ou France Delivrée*, which employed him ſeveral years. He was one of the king's counſellors, but was very covetous; and died in 1674, very rich.

Chapel-allerton, a village near Leeds.

Chapel bay, on the coaſt of Big Iſland.

* CHAPELESS. *adj.* [from *chape.*] Wanting a chape.—An old ruſty ſword, with a broken hilt, and *chapeleſs*, with two broken points. *Shak.*

CHAPELET. See Chaplet, § 1. *def.* 4.

Chapel-Garth, a village in Northumberland, near Newcaſtle.

(1.) CHAPEL-HILL, a poſt town of the United States, in Orange County, N. Carolina, ſeated on a branch of Newhope Creek, which runs into the NW. branch of Cape Fear. It has an elevated and beautiful ſituation, with a fine proſpect of the country around; and is the ſeat of the new Univerſity of N. Carolina; which was ſo far completed in Jan. 1795, as to admit ſtudents. It is 11 miles S. by E. of Hillſborough, and 465 SW. of Philadelphia; from which it lies in Lon. 4. 5. W. Lat. 35. 37. N.

(2.) Chapel-Hill, 3 miles N. of Chepſtow.

(3.) Chapel-Hill, near Haſcomb, Surry.

Chapel in Frith, a town in Derbyſhire, on the confines of the Peak, near Cheſhire. It has 7 fairs, and a market on Sat. It is 17 miles SE. of Mancheſter, and 165 NNW. of London. Lon. 1. 55. W. Lat. 53. 22. N.

Chapel-Ings, a town 6 miles from Kendal, Weſtmoreland.

Chapel in the Street, a village in Cheſhire, W. of Knotsford.

Chapel-Izod, a town of Ireland, ſeated on the Liffey, 3 miles from Dublin.

* CHAPELLANY. *n. ſ.* [from *chapel.*] A *chapellany* is uſually ſaid to be that which does not ſubſiſt of itſelf, but is built and founded within ſome other church, and is dependant thereon *Ayliffe's Parergon.*

(1.) CHAPELLE, a town of France, in the dep. of Paris, between that city and St Denys.

(2.) Chapelle, Claudius Emanuel Luillier, the natural ſon of Francis Luillier, took the name of *Chapelle* from the village (N° 1.) where he was born. He wrote ſmall pieces of poetry, in which he diſcovered great delicacy, an eaſy turn, and an admirable facility of expreſſion. He was the friend of Gaſſendi and Moliere; and died in 1686.

CHAPELLINA. See Chaplet, § 3.

Chapel-Long, a village in Shropſhire, 2 miles NW. of Saltfleet.

Chapel-Midway, a village of Ireland, 7 miles from Dublin.

Chapel of Garioch. See Garioch.

Chapel of Plaster, a town near Box, Wiltſ.

Chapel of the Grune, a village in Cumberland, near Boulneſs.

Chapel on the Heath, near Norton, Oxford.

* CHAPELRY. *n. ſ.* [from *chapel.*] The juriſdiction or bounds of a chapel.

(1.) * CHAPERON. *n. ſ.* [French.] A kind of hood or cap worn by the knights of the garter in their habits.—I will omit honourable habiliments, as robes of ſtate, parliament robes, *chaperons*, and caps of ſtate. *Camden.*

(2.) **Chaperon, Chaperonne, or Chaperoon**, was a ſort of hood or covering of the head anciently worn by both men and women, of all ranks, and afterwards appropriated to the doctors, and licentiates in colleges, &c. Hence the name paſſed to certain little ſhields, and other funeral devices, placed on the foreheads of the horſes that drew the hearſes in pompous funerals, which are ſtill called *chaperoons*, or *ſhafferoons*; becauſe theſe were originally faſtened on the *chaperonnes*, worn by thoſe horſes.

(3.) **Chaperon of a bit mouth**, in the manege, is only uſed for ſcatch mouths, and all others that are not cannon mouths, ſignifying the end of the bit that joins to the branch juſt by the banquet. In ſcatch mouths the chaperon is round, but in others it is oval: and the ſame part that in ſcatch and other mouths is called *chaperon*, is in cannon mouths called *fronceau*.

* CHAPFALN. *adj.* [from *chap* and *faln.*] Having the mouth ſhrunk.—

A *chapfaln* beaver looſely hanging by
The cloven helm. *Dryden.*

(1.) * CHAPITER. *n. ſ.* [*chapiteau*, Fr.] The upper part or capital of a pillar.—He overlaid their *chapiters* and fillets with gold. *Exodus.*

(2.) **Chapiters**, in law, formerly ſignified a ſummary of ſuch matters as were enquired of, or preſented before juſtices in eyre, juſtices of aſſize, or of the peace, in their ſeſſions. Chapiters now denote ſuch articles as are delivered by the mouth of the juſtice in his charge to the inqueſt.

(1.) * CHAPLAIN. *n. ſ.* [*capellanus*, Lat.] 1. He that performs divine ſervice in a chapel, and attends the king, or other perſon, for the inſtruction of him and his family, to read prayers, and preach. *Cowel.* 2. One that officiates in domeſtick worſhip.—A chief governour can never fail of ſome worthleſs illiterate *chaplain*, fond of a title and precedence. *Swift.*

(2.) **Chaplain, origin of the title.** Some ſay, the ſhrines of relics were anciently covered with a kind of tent, cape, or *capella*, i. e. little cape; and that hence the prieſts, who had the care of them, were called chaplains. In time theſe relics were repoſited in a little church, either contiguous to a larger, or ſeparate from it; and the name, *capella*, which was given to the cover, was alſo given to the place where it was lodged; and hence the prieſt who ſuperintended it came to be called *capellanus* or *chaplain*.

(3.) **Chaplains, ancient.** The firſt chaplains are ſaid to have been thoſe inſtituted by the ancient kings of France, for preſerving the *chape*, or cape, with the other relics of St Martin, which the kings kept in their palace, and carried out with them to the war. The firſt chaplain is ſaid to have been William de Meſmes, chaplain to St Louis.

(4.) **Chaplains in the order of Malta** are the ſecond rank, or claſs in that order; otherwiſe called diacones: the knights being the firſt.

(5.) **Chaplains, law respecting.** According to a ſtatute of Henry VIII. the perſons veſted with a power of retaining chaplains, and the number each is allowed to qualify, are as follow: An archbiſhop, 8; a duke or biſhop, 6; marquis or earl, 5; viſcount, 4; baron, knight of the garter, or lord chancellor, 3; a ducheſs, marchioneſs, counteſs, baroneſs, the treaſurer and comptroller of the king's houſe, clerk of the cloſet, the king's ſecretary, dean of the chapel, almoner, and maſter of the rolls, each of them 2; chief juſtice of the king's bench, and ward of the cinque ports, each 1. All theſe chaplains may purchaſe a licence or diſpenſation, and take two benefices with cure of ſouls. A chaplain muſt be retained by letters teſtimonial under hand and ſeal; for it is not ſufficient that he ſerve as chaplain in the family.

(6.) **Chaplains of the pope** are the judges of cauſes in the ſacred palace; ſo called, becauſe the pope anciently gave audience in his chapel, for the deciſion of caſes ſent from the different parts of Chriſtendom. Hither he ſummoned, as aſſeſſors, the moſt learned lawyers of his time; and they hence acquired the appellation of *capellani*, chaplains. It is from the decrees formerly given by theſe, that the body of decretals is compoſed: their number pope Sixtus IV. reduced to twelve.

(7.) **Chaplains royal.** In England there are 48 chaplains to the king who wait 4 each month, preach in the chapel, read the ſervice to the family, and to the king in his private oratory, and ſay grace in the abſence of the clerk of the cloſet. While in waiting they have a table and attendance, but no ſalary. In Scotland the king has 6 chaplains, with a ſalary of L. 50 each, 3 of them having in addition the deanery of the chapel royal divided between them, making up above L. 100 to each. Their only duty at preſent is to ſay prayers at the election of peers for Scotland to ſit in parliament.

* CHAPLAINSHIP. *n. ſ.* [from *chaplain.*] 1. The office or buſineſs of a chaplain. 2. The poſſeſſion or revenue of a chapel.

* CHAPLESS. *adj.* [from *chap.*] Without any fleſh about the mouth.—Now *chapleſs*, and knocked about the muzzard with a ſexton's ſpade. *Shak.*

(1.) * CHAPLET. *n. ſ.* [*chapelet*, Fr.] 1. A garland or wreath to be worn about the head.—

All the quire was grac'd
With *chaplets* green, upon their foreheads plac'd.
Dryden.

2. A ſtring of beads uſed in the Romiſh church for keeping an account of the number rehearſed of pater-noſters and ave-marias. A different ſort of *chaplets* is alſo uſed by the Mahometans. 3. [In architecture.] A little moulding carved into round beads,

beads, pearls or olives. 5. [In horſemanſhip.] A couple of ſtirrup leathers, mounted each of them with a ſtirrup, and joining at top in a ſort of leather buckle, which is called the head of the *chaplet*, by which they are faſtened to the pummel of a ſaddle, after they have been adjuſted to the length and bearing of the rider. *Farrier's Dict.* 5. A tuft of feathers on the peacock's head.

(2.) CHAPLET is frequently uſed to ſignify the circle of a crown. There are inſtances of its being born in a coat of arms, as well as for creſts; the paternal arms for Laſcelles are argent, 3 chaplets, gules.

(3.) CHAPLETS, (§ 1. *def.* 2.) are ſometimes called *pater-noſters*; and are made of coral, of diamonds, of wood, &c. The common chaplet contains 50 ave-marias, and 5 pater-noſters. There is alſo a chaplet of our Saviour, conſiſting of 33 beads, in honour of his 33 years living on earth, inſtituted by father Michael the Camaldulian. The invention of this ſuperſtition is aſcribed to Peter the hermit, who probably learned it of the Turks, as they from the Eaſt Indians. The Orientals have a kind of chaplets which they call *chains*, and which they uſe in their prayers, rehearſing one of the perfections of God on each link. The great Mogul is ſaid to have 18 of theſe chains, all precious ſtones; ſome diamonds, others rubies, &c. The Turks have alſo chaplets of 60 beads, which they bear in the hand, or hang at the girdle: but they differ from thoſe uſed by the Romaniſts, in that they are all of the ſame bigneſs, and have not the diſtinction into decads. The muſſulmans run over the chaplet almoſt in an inſtant, the prayers being extremely ſhort, containing only theſe words, *Praiſe to God*, or *Glory to God*, for each bead. They have likewiſe a larger chaplet conſiſting of 100 beads, divided by little threads into 3 parts; on one of which they repeat 30 times *Soubhan Allah*, i. e. God is worthy to be praiſed; on another *Ellamb Allah*, glory be to God; and on the third, *Allah ecber*, God is great. Theſe thrice 30 times making only 90; to complete the number 100, they add other prayers for the beginning of the chaplet. The Mahometan chaplet appears to have had its riſe from the *mea beratoth*, or *hundred benedictions*, which the Jews repeat daily; the Jews and Mahometans having this in common, that they ſcarce do any thing without pronouncing ſome benediction. The modern Latins call the chaplet CHAPELLINA; the Italians more frequently *corona*.

(1.) CHAPMAN, George, an Engliſh poet, born in 1557. He received a univerſity education, and acquired a conſiderable knowledge of the Latin and Greek languages. He was highly eſteemed for his dramatic and poetic works. He wrote 17 plays; and tranſlated Homer and ſome other ancient poets. He died in 1643; and was buried in St Giles's in the fields, where his friend, Inigo Jones, erected a monument to him.

(2.) CHAPMAN, a learned Engliſh divine, born in 1704. He was educated at Eton and at King's college, Cambridge, and obtained from Archbiſhop Potter, the livings of Merſham and Aldington in Kent; and had the degree of D. D. conferred on him by the univerſity of Oxford. As executor to the archbiſhop, he preſented himſelf to the precentorſhip of Lincoln, for which he was attacked in chancery, and got a decree in his favour from the chancellor, which was reverſed by the houſe of lords. He died in 1784. He publiſhed *Euſebius*, or a Defence of Chriſtianity, 2 vols 8vo; and two tracts relating to Phlegon, in anſwer to Dr Sykes; he alſo aſſiſted biſhop Pearce in his edition of *Cicero de Officiis*.

(3.) * CHAPMAN. *n. ſ.* [*ceapman*, Sax.] A cheapner; one that offers as a purchaſer.—

Fair Diomede, you do as *chapmen* do,
Diſpraiſe the thing that you intend to buy.
Shakeſpeare.

CHAPMANSLADE, a village in Wiltſhire, N. E. of Warminſter.

CHAPONE, Sarah, an ingenious Engliſh lady, born in 1726, in Northamptonſhire, of a reſpectable family named *Mulſo*. She appears to have been *unhappily* married with Mr Chapone. The intereſting ſtory of *Fidelia*, in the Adventurer; and a poem, prefixed to the tranſlation of Epictetus, by Mrs Carter, were among the firſt productions of her pen, ſince ſo much celebrated for *Letters on the Improvement of the Mind*, addreſſed to a young Lady, and firſt printed in 1755. Beſides this excellent work, Mrs Chapone wrote a volume of Miſcellanies, containing moral Eſſays and Poems. She died at Hadley, in Middleſex, in Dec. 1801.

(1.) CHAPPE', in heraldry, the dividing an eſcutcheon by lines drawn from the centre of the upper edge to the angles below, into three parts, the ſections on the ſides being of different metal or colour from the reſt.

(2.) CHAPPE D'AUTEROCHE, an eminent aſtronomer, born of a noble family in Upper Auvergne, in 1728. He ſtudied in the college of Louis le Grand, and made a rapid progreſs in the mathematics. He was employed by the celebrated Caſſini in delineating his general map of France. In 1752, he publiſhed a French tranſlation of the works of Dr Halley; and not long after was nominated ſuperintendant of ſome important works in Lorraine. On his return to Paris he was choſen member of the academy of ſciences, and in 1759 was appointed aſſiſtant aſtronomer. In 1760, he went to Tobolſk in Siberia, to obſerve the tranſit of Venus, which was to happen on the 6th of June the following year: and in 1768, publiſhed an account of his journey, in 3 vols 4to. This year alſo, he went to California, to obſerve the tranſit of Venus, which was to happen in 1769; and died there on the 11th of Auguſt that year.

* CHAPPED. See CHAPT.

CHAPPEL, William, a learned and pious biſhop of Cork, Cloyne, and Roſs, in Ireland, born in Nottinghamſhire in 1582. When the troubles began under Charles I. he was proſecuted by the puritan party in parliament, and retired to Derby, where he devoted himſelf to ſtudy until his death in 1649. He wrote *Methodus Concionandi*, i. e. the method of preaching: and he is one of thoſe to whom the *Whole Duty of Man* has been attributed. He left behind him alſo his own life written by himſelf in Latin, which has been twice printed.

* CHAPS. *n. ſ.* [from *chap.*] 1. The mouth of a beaſt of prey.—

Their whelps at home expect the promis'd food,
And long to temper their dry *chaps* in blood. *Dryden.*

2. It is uſed in contempt for the mouth of a man.

* CHAPT. CHAPPED. *part. paſſ.* [from *To chap.*] —Like a table upon which a you may run your finger without rubs, and your nail cannot find a joint; not horrid, rough, wrinkling, gaping, or *chapt. Ben Jonſon.*

(1.) * CHAPITER. *n. ſ.* [*chapitre*, Fr. from *capitulum*, Lat.] 1. A diviſion of a book.—The firſt book we divide into three ſections; whereof the firſt is theſe three *chapters. Burnet's Theory.*—If theſe mighty men at *chapter* and verſe, can produce then no ſcripture to overthrow our church ceremonies, I will undertake to produce ſcripture enough to warrant them. *South.* 2. From hence comes the proverbial phraſe, *to the end of the chapter;* throughout; to the end.—Money does all things; for it gives and it takes away, it makes honeſt men and knaves, fools and philoſophers; and ſo forward, *mutatis mutandis, to the end of the chapter. L'Eſtrange.* 5. *Chapter,* from *capitulum,* ſignifieth, in our common law, as in the canon law, whence it is borrowed, an aſſembly of the clergy of a cathedral or collegiate church. *Cowel.* —The abbot takes the advice and conſent of his *chapter,* before he enters on any matters of importance. *Addiſon on Italy.* 4. The place where delinquents receive diſcipline and correction. *Ayliffe.* 5. A decretal epiſtle. *Ayliffe.* 6. Chapter-houſe; the place in which aſſemblies of the clergy are held.—Though the canonical conſtitution does not ſtrictly require it to be made in the cathedral, yet it matters not where it be made, either in the choir or *chapter-houſe. Ayliffe.*

(2.) CHAPTER, in eccleſiaſtical polity. See § 1. *def.* 3. It was in the 8th century that the body of canons began to be called a chapter. They were a ſtanding council to the biſhop, and during the vacancy of the ſea, had the juriſdiction of the dioceſe. In the earlier ages, the biſhop was head of the chapter; afterwards abbots and other dignitaries, were preferred to this diſtinction. The deans and chapters had the privilege of chooſing the biſhops in England; but Henry VIII. got this power veſted in the crown. Thoſe he thus regulated were called deans and chapters of the new foundation; ſuch are Canterbury, Wincheſter, Ely, Carliſle, &c. See DEAN.

* CHAPTREL. *n. ſ.* [probably from *chapiter.*] The capitals of pillars, or pilaſters, which ſupport arches, commonly called impoſts.—Let the keyſtone break without the arch, ſo much as you project over the jaums with the *chaptrels. Moxon.*

(1.) * CHAR. *n. ſ.* [*cyrre*, work, Sax. *Lye.* It is derived by *Skinner,* either from *charge,* Fr. buſineſs, or *carc,* Sax. care, or *keeren,* Dutch, to ſweep.] Work done by the day; a ſingle job or taſk.—

A meer woman and commanded
By ſuch poor paſſion, as the maid that milks,
And does the meaneſt *chars.* *Shak.*

(2.) * CHAR. *n. ſ.* [of uncertain derivation.] A fiſh found only in Winandermere in Lancaſhire.

(3.) CHAR, in ichthyology. See SALMO.

(4.) CHAR, a river in Dorſetſhire.

(5.) CHAR OF LEAD is equal to 30 pigs.

(1.) * *To* CHAR. *v. a.* [See CHARCOAL.] To burn wood to a black cinder.—Spraywood, in *charring,* parts into various cracks. *Woodward.*

(2.) * *To* CHAR. *v. n.* [from the noun.] To work at others houſes by the day, without being a hired ſervant.

CHARA, in botany: A genus of the monandria order, belonging to the monœcia claſs of plants. There is neither male calyx nor corolla; and the anthera is placed under the germen. The female calyx is tetraphyllous; no corolla; the ſtigma quinquefid, with one roundiſh ſeed.

CHARABON, a ſea-port town on the N. coaſt of Java in the Indian ocean; 150 miles E. of Batavia. It is ſituated in a country abounding in rice, ſugar, coffee, pepper, cotton, &c. which the Dutch purchaſe at a low rate. Lon. 109, 50, E. Lat. 6. 0. S.

CHARACENE, the moſt ſouthern part of Suſiana, a province of Perſia, lying on the Perſian gulph, between the Tigris and the Eulæus; ſo named from the city of CHORAX. It was ſeized by Paſines, the ſon of Sogdonacus, king of the neighbouring Arabs, during the troubles of Syria, and erected into a kingdom. Lucian calls him Hyſpaſines, and adds, that he ruled over the Characeni and the neighbouring people: he died in the 85th year of his age. The only other kings of this country, mentioned by the ancients, are, Teræus, who died in the 92d year of his age; and after him Artabazus the 7th, as Lucian informs us, who was driven from the throne by his ſubjects, but reſtored by the Parthians.

CHARACENI, the people of CHARACENE.

(1.) * CHARACTER. *n. ſ.* [*character*, Latin; χαρακτηρ.] 1. A mark; a ſtamp; a repreſentation.—

In outward alſo her reſembling leſs
His image, who made both; and leſs expreſſing
The *character* of that dominion giv'n
O'er other creatures. *Par. Loſt.*

2. A letter uſed in writing or printing.— —It were much to be wiſhed, that there were throughout the world but one ſort of *character* for each letter, to expreſs it to the eye; and that exactly proportioned to the natural alphabet formed in the mouth. *Holder.* 3. The hand or manner of writing.—I found the letter thrown in at the caſement of my cloſet.—You know the *character* to be your brother's. *Shakeſpeare.* 4. A repreſentation of any man as to his perſonal qualities.—Homer has excelled all the heroick poets that ever wrote, in the multitude and variety of his *characters;* every god that is admitted into his poem, acts a part which would have been ſuitable to no other deity. *Addiſon.* 5. An account of any thing as good or bad.—This ſubterraneous paſſage is much mended, ſince Seneca gave ſo bad a *character* of it. *Addiſon on Italy.* 6. The perſon with his aſſemblage of qualities; a perſonage, —In a tragedy, or epick poem, the hero of the piece muſt be advanced foremoſt to the view of the reader or ſpectator; he muſt outſhine the reſt of all the *characters;* he muſt appear the prince of them, like the ſun in the Copernican ſyſtem, encompaſſed with the leſs noble planets. *Dryden.* 7. Perſonal qualities; particular conſtitution of the mind.—

Nothing ſo true as what you once let fall;
Moſt women have no *characters* at all. *Pope.*

8. Adventitious qualities impreſſed by a poſt or office.—The chief honour of the magiſtrate conſiſts in maintaining the dignity of his *character* by ſuitable actions. *Atterbury.*

(II.) CHARACTER, in a general ſenſe, ſignifies a mark or figure, drawn on paper, metal, ſtone, or other matter, with a pen, graver, chiſſel, or other inſtrument, to denote any thing. The various kinds of characters may be reduced to 3 claſſes; viz. *Literal Characters*, *Numeral Characters*, and *Abbreviations.*

i. CHARACTERS, LITERAL, are letters of the alphabet, ſerving to indicate ſome articulate ſound, expreſſive of ſome idea or conception of the mind. See ALPHABET. Theſe may be divided, with regard to their nature, invention and uſe, into *Nominal, Real, and Symbolical*; as well as into *Particular, and Univerſal Characters.*

1. CHARACTERS, NOMINAL, thoſe we properly call *letters*; which ſerve to expreſs the names of things: See LETTER.

2. CHARACTERS, PARTICULAR, are thoſe peculiar to ſome nation: Such are the Roman, Italic, Greek, Hebrew, Arabic, Gothic, Chineſe, &c. See CHINESE, GOTHIC, HEBREW, &c. The Latin character, now uſed through all Europe, was formed from the Greek, as the Greek was from the Phœnician; and the Phœnician, as well as the Chaldee, Syriac, and Arabic characters, were formed from the ancient Hebrew, which ſubſiſted till the Babyloniſh captivity; for after that event the character of the Aſſyrians, which is the ſquare Hebrew now in uſe, prevailed, the ancient being only found on ſome Hebrew medals, commonly called Samaritan medals. Medalliſts obſerve, that the Greek character, conſiſting only of majuſcule letters, has preſerved its uniformity on all medals, as low as the time of Gallienus, after which it appears ſomewhat weaker and rounder. From the time of Conſtantine to Michael we find only Latin characters: after Michael, the Greek characters recommence; but from that time they began to alter with the language, which was a mixture of Greek and Latin. The Latin medals preſerve both their character and language as low as the tranſlation of the ſeat of the Empire to Conſtantinople; towards the time of Decius the character began to loſe its roundneſs and beauty; ſome time after, it retrieved, and ſubſiſted tolerable till the time of Juſtin, when it degenerated gradually into the Gothic. In 1091, the Gothic characters invented by Ulſilas were aboliſhed, and the Latin characters re-eſtabliſhed.

3. CHARACTERS, REAL, thoſe that inſtead of names expreſs things and ideas: See IDEA, &c.

4. CHARACTERS, SYMBOLICAL, or EMBLEMATICAL, which have this in common with real ones, that they expreſs the things themſelves; but have this further, that they in ſome meaſure perſonate them, and exhibit their form: ſuch are the hieroglyphics of the ancient Egyptians. See HIEROGLYPHIC, SYMBOL, &c.

5. CHARACTERS, UNIVERSAL, are alſo *real characters*, and make what ſome authors call a *Philoſophical Language.* That diverſity of characters, uſed by the ſeveral nations to expreſs the ſame idea, is found the chief obſtacle to the advancement of learning: to remove this, ſeveral authors have taken occaſion to propoſe plans of characters that ſhould be univerſal, and which each people ſhould read in their own language. The character here is to be real, not nominal: to expreſs things and notions; not, as the common ones, letters or ſounds: yet to be mute, like letters, and arbitrary; not emblematical, like hieroglyphics. Thus, every nation ſhould retain its own language; yet every one underſtand that of each other, without learning it; only by ſeeing a real or univerſal character, which ſhould ſignify the ſame things to all people, by what ſounds ſoever each expreſs it in their particular idiom. For inſtance, by ſeeing the character deſtined to ſignify *to drink*, an Engliſhman ſhould read *to drink*; a Frenchman, *boire*; a Latin, *bibere*; a Greek, πινειν; a Jew, שתה; a German, *trincken*; and ſo of the reſt: in the ſame manner as ſeeing a horſe, each people expreſſes it after their own manner; but all mean the ſame animal. This real character is no chimera; the Chineſe and Japaneſe have already ſomething like it. They have a common character which each of thoſe nations underſtand alike in their ſeveral languages; though they pronounce them with ſuch different ſounds, that they do not underſtand one another in ſpeaking. The firſt and moſt conſiderable attempts for a real character, or philoſophical language, in Europe, are thoſe of biſhop Wilkins and Dalgarne: but theſe, with how much art ſoever they were contrived, have yet proved ineffectual. M. Leibnitz had ſome thoughts the ſame way; he thinks thoſe great men did not hit the right method. It was probable, indeed, that by their means, people, who do not underſtand one another, might eaſily have a commerce together; but they have not hit on true real characters. According to him, the characters ſhould reſemble thoſe uſed in Algebra: which, in effect, are very ſimple, yet very expreſſive; without any thing ſuperfluous or equivocal: and contain all the varieties required. The real character of biſhop Wilkins has its juſt applauſe: Dr Hook recommends it on his own knowledge and experience, as a moſt excellent ſcheme; and to engage the world to the ſtudy thereof, publiſhes ſome fine inventions of his own therein. M. Leibnitz tells us, he had under conſideration an *alphabet of human thoughts*; in order to a new philoſophical language, on his own ſcheme: but his death prevented it being brought to maturity. M. Lodwic, in the *Philoſophical Tranſactions*, gives us a plan of *an univerſal alphabet* or *character* of another kind: this was to contain an enumeration of all ſuch ſingle ſounds, or letters, as are uſed in any language; by means whereof, people ſhould be enabled to pronounce truly and readily any language; to deſcribe the pronunciation of any language that ſhall be pronounced in their hearing, ſo as others accuſtomed to this language, though they had never heard the language pronounced, ſhall at firſt be able truly to pronounce it: and, laſtly, this character to ſerve as a ſtandard to perpetuate the ſounds of any language. In the *Journal Literaire*, 1720, we have a very ingenious project for an univerſal character. The author, after obviating the objections that might

be made againſt the feaſibleneſs of ſuch ſchemes in the general, propoſes his own: his characters are to be the common Arabic, or numeral figures. The combinations of theſe nine are ſufficient to expreſs diſtinctly an incredible quantity of numbers, much more than we ſhall need terms to ſignify our actions, goods, evils, duties, paſſions, &c. Thus is all the trouble of framing and learning any new character at once ſaved; the Arabic figures having already all the univerſality required. The advantages are immenſe. For, 1ſt, We have here a ſtable, faithful interpreter; never to be corrupted or changed, as the popular languages continually are. 2d, Whereas the difficulty of pronouncing a foreign language is ſuch as uſually gives the learner the greateſt trouble, and there are even ſome ſounds which foreigners never attain to; in the character here propoſed, this difficulty has no place: every nation is to pronounce them according to the particular pronunciation that already obtains among them. All the difficulty is, the accuſtoming the pen and the eye to affix certain notions to characters that do not, at firſt ſight, exhibit them. But this trouble is no more than we find in the ſtudy of any language whatever. The inflections of words are here to be expreſſed by the common letters. For inſtance, the ſame character ſhall expreſs a *filly* or a *colt*, a *horſe* or a *mare*, an *old horſe* or an *old mare*, as accompanied with this or that diſtinctive letter, which ſhall ſhow the ſex, youth, maturity, or old age: a letter alſo to expreſs the bigneſs or ſize of things; thus *e.g.* a man with this or that letter, to ſignify a *great man*, or a *little man*, &c. The uſe of theſe letters belongs to the grammar; which, once well underſtood, would abridge the vocabulary exceedingly. An advantage of this grammar is that it would only have one declenſion and one conjugation: thoſe numerous anomalies of grammarians are exceeding troubleſome; and ariſe hence, that the common languages are governed by the populace, who never reaſon on what is beſt: but in the character here propoſed, men of ſenſe having the introduction of it, would have a new ground, whereon to build regularly. But the difficulty is not in inventing the moſt ſimple, eaſy, and commodious character, but in engaging the ſeveral nations to uſe it; there being nothing they agree leſs in, than the underſtanding and purſuing their common intereſt.

ii. CHARACTERS, NUMERAL, or characters uſed to expreſs numbers, are either letters or figures. The former were uſed by moſt ancient nations, before the invention of the latter by the Arabs; and the Roman numerals (§ 5.) are ſtill uſed for various purpoſes.

1. CHARACTERS, ARABIC, NUMERAL, the common figures, now uſed almoſt throughout all Europe and America, in all ſorts of calculations, conſiſt of theſe ten digits, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0. The uſe of theſe ten numerals, and particularly of the cypher, has rendered modern arithmetic, the moſt perfect of the ſciences. See ARITHMETIC, *Index*.

2. CHARACTERS, FRENCH NUMERAL, uſed in the ci-devant chamber of accounts, and by thoſe concerned in the revenue, were chiefly Roman numerals, (See § 4.) only in ſmall letters: thus j, or i, 1, v 5, x 10, l 50, and c 100. But inſtead of m, or cjc, the Greek ϡ was uſed for 1000; and ſometimes iiij^{xxx} for 90. b was alſo uſed for v 5.

3. CHARACTERS, GREEK NUMERAL. The Greeks had three ways of expreſſing numbers: I. Every letter, according to its place in the alphabet, denoted a number, from α, 1, to ω, 24. In this manner the books of Homer's Iliad are numbered. II. Another way was by dividing the alphabet into, 1ſt, 8 Units: α 1, β 2, &c. 2dly, 8 Tens: ι 10, κ 20, &c. 3dly, 8 Hundreds: ρ 100, σ 200, &c. And to complete theſe numbers, the contraction ϛ ſtood for 6, as well as for 90 and 900. Thouſands they expreſſed by a point or accent under a letter, e. g. α̣ 1000, β̣ 2000, &c. III. Their 3d way was by ſix capital letters, being the initials of the words; thus, Ι [ια for μια] 1; Π [πεντε] 5; Δ [δεκα] 10; Η [Ηκατον] 100; Χ [χιλια] 1000; Μ [μυρια] 10,000: and when the letter Π incloſed any of theſe, except Ι, it ſhewed the incloſed letter to be five times its own value, as $\overline{|\Delta|}$ 50, $\overline{|\mathrm{H}|}$ 500, $\overline{|\mathrm{X}|}$ 5000, $\overline{|\mathrm{M}|}$ 50,000.

4. CHARACTERS, HEBREW NUMERAL. The Hebrew alphabet was divided into 9 Units: א 1, ב 2, &c.—9 Tens: י 10, כ, 20, &c.—9 Hundreds: ק 100, ר 200, &c. ך 500, ם 600, ן 700, ף 800, ץ 900. Thouſands were ſometimes expreſſed by the units prefixed to hundreds, as אדלר, 1534, &c. and even to tens, as, אע, 1070, &c. But generally by the word אלף, 1000; אלפים, 2000; אלפים, with the other numerals prefixed, to ſignify the number of thouſands: *e. g.* גאלפים, 3000, &c.

5. CHARACTERS ROMAN NUMERAL, conſiſt of 7 majuſcule letters of the Roman alphabet, viz. I, V, X, L, C, D, M. The I denotes 1, V 5, X 10, L 50, C 100, D 500, and M 1000. The I repeated twice makes 2, II; thrice, 3, III: four is expreſſed thus IV, as I before V or X takes one from the number expreſſed by the letters. One I added to V, makes ſix, VI; two ſeven, VII; and three, VIII; nine is expreſſed by an I before X, thus IX. X before L or C, diminiſhes the number by tens: thus, XL denotes forty, XC ninety; but X after L, or C, proportionably increaſes them; as LX ſixty; LXX ſeventy, &c. The C before D or M diminiſhes each by a hundred. Five hundred is ſometimes expreſſed by an I before a C inverted thus, IↃ; and 1000 by an I between two C's, the one direct, and the other inverted, thus CIↃ. The addition of C and Ↄ before and after raiſes CIↃ by tens; thus, CCIↃↃ expreſſes ten thouſand, CCCIↃↃↃ, a hundred thouſand. The Romans alſo expreſſed any number of thouſands by a line drawn over any numeral leſs than a thouſand; thus $\overline{\mathrm{V}}$ denotes 5000; $\overline{\mathrm{LX}}$, 60,000; ſo likewiſe $\overline{\mathrm{M}}$ is one million, $\overline{\mathrm{MM}}$ two millions, &c.

iii. CHARACTERS OF ABBREVIATION are ſymbols contrived for the more conciſe conveyance of the knowledge of things, in ſeveral of the arts; ſuch as,

1. CHARACTERS IN ALGEBRA. See ALGEBRA, INTRODUCTION.

2. CHARACTERS, IN ASTRONOMY, are

(1.) CHARACTERS OF THE ASPECTS, NODES, &c.

Bq	Biquintile	☌ or S	Conjunction
☊	Dragon's head	SS	Semiſextile

☋ Dragon's tail
☍ Oppoſition
□ Quartile
Q Quintile
* Sextile
Td Tredecile
△ Trine
Vc Quincunx

(2.) Characters of the Planets. See *Plate* XXVIII. *fig.* 11.

(3.) Characters of the Signs. See *Plate* XVI. *fig.* 10.

(4.) Characters of Time.

A. M. *ante meridiem*, fore-noon, before the ſun comes upon the meridian.
M. *mane*, morning.
N. or O. noon.
P. M. *poſt meridiem*, after-noon, when the ſun is paſt meridian.

3. Characters in Chemistry. See *Pl.* 66.

4. Characters in Commerce.

C, or ⊕ hundred weight, or 112 pounds
Cwt,
d pence or deniers
D^{o} ditto, or the ſame
D^{t} ducat
F^{o} folio, or page
L. or *l*. pounds ſterling
lb. with a line acroſs, pound weight
N^{o} *numero*, or number
p^{r} *per*, or by; as p^{r} *ann.* by the year; p^{r} *cent.* by the hundred.
P. S. poſtſcript
q^{rs} quarters
R^{o} *recto folio*, the right page.
R^{x} rixdollar
S, or *s* ſhillings
V^{o} *vero folio*, the true page.

5. Characters in Geometry and Trigonometry.

∠ an angle
∟ right angle
⊙ a circle
° a degree
$\underset{=}{\mathrm{V}}$ Equiangular, or ſimilar
≐ equilateral
‖ parallel
′ a minute
″ a ſecond
‴ a third
⁗ fourths
⊥ perpendicular
[] ▭ rectangle
□ ſquare
△ Triangle

6. Characters in Grammar, Poetry, Rhetorick, &c.

! admiration
’ apoſtrophe
* aſteriſk
˘ breve
‸ caret
^ circumflex
: colon
, comma
[] crotchet
¨ dialyſis
` emphaſis, or accent
- hyphen
? interrogation
¶ paragraph
( ) parentheſis
. period
“ quotation
† ‡ references
§ ſection
; ſemicolon.

A. B. bachelor of arts
Abp. archbiſhop
A. D. year of our Lord
A. M. maſter of arts
A. M. year of the world
B. D. Bachelor of divinity
Bp. Biſhop
D. D. doctor in divinity
e. g. exampli gratia, for example
F. A. S. fellow of the antiquarian ſociety
F. R. S. fellow of the royal ſociety
i. e. id eſt, that is
J. V. D. *juris utriuſque doctor*, doctor of civil and canon law
L. L. D. *legum doctor*, doctor of laws
q. d. quaſi dictum as if it were ſaid
S. S. T. D. *ſacro-ſanctæ theologiæ doctor*, doctor in ſacred theology
V. D. M. *verbi Dei miniſter*, miniſter of the word of God

7. Characters in Medicine and Pharmacy.

(See *Plate* LXV. *fig.* 7.)

ā, *āā*, or Ana, } of each alike
C. C. *cornu cervi*, hartſhorn
Coch. *cochleare*, a ſpoonful
Cong. *congius*, a gallon
Gr. grains
L. L. laudanum
M. *manipulus*, a handful
M. with a daſh acroſs, *miſce*, i. e. mix them
P. a pugil
P. Æ. *partes æquales*, equal quantities
P. P. *pulvis patrum*, Jeſuits bark
q. pl. *quantum placeat*, as much as you pleaſe
q. s. *quantum ſufficit*, a ſufficient quantity
R. *recipe*, take
S. A. *ſecundem artem*, according to art
Ss. or *ſs*, *ſemis*, the half of any thing.
Tinct. Theb. *tinctura thebaica*, laudanum, &c.

8. Characters in Music. See Music.

9. Characters in old law writings and ancient inscriptions. (See alſo Medals.)

B. AV. *bonis avibus*. or *auſpiciis*, *i. e.* with good omens.
C. code
C. C. Conſules
E. extra
ff. digeſts
JCtus, *juris conſultus*, a lawyer
§ paragraph
P. M. *pontifex maximus*, high prieſt
P. P. D. D. *propria pecunia dedicavit*, erected at his own expence
P. P. *pater patriæ*, father of his country
SCto. *ſenatus conſulto*, by advice, or order of the ſenate
S. P. Q. R. *ſenatus populuſque Romanus*, the ſenate and people of Rome
T. *titulus*, title
T. P. or Tr. Pot. } *tribunicia poteſtate*, the office of Tribune.

10. Characters upon Tomb Stones.

D. D. M. *dono dedit monumentum*, preſented or erected a monument.
D. M. *diis manibus*, to the gods, manes, or tutelar genii.
D. O. M. *deo optimo maximo*, to the Almighty.
IHS. IHΣΤΣ, Jeſus.
M. S. *memoriæ ſacrum*, ſacred to the memory
S. V. *ſiſte viator*, ſtop traveller.
XP. a character found in the catacombs, about the meaning of which antiquaries are not agreed; but the moſt probable opinion is, that it is a contraction for Χριστος, Chriſt.

(III.) Character, in human life, that which is peculiar in the manners of any perſon, and diſtinguiſhes him from others. See § I. *def.* 4, 7. Good character is particulary applied to that conduct which is regulated by virtue and religion; in an inferior but very common ſenſe, it is underſtood of mere honeſty of dealings between man and man. The importance of a good character in the commerce of life ſeems to be univerſally acknowledged. To thoſe who are to make their own way either to wealth or honours, a good character is uſually no leſs neceſſary than addreſs or abilities. An elegant moraliſt obſerves, that "Though human nature is degenerate, and corrupts itſelf ſtill more by its own inventions; yet it uſually retains to the laſt an eſteem for excellence. But even if we are arrived at ſuch an extreme degree of depravity as to have loſt our native reverence for virtue; yet a regard to our own intereſt and ſafety, which we ſeldom loſe, will lead us to apply for aid, and in all important tranſactions, to men whoſe integrity is unimpeached. When we chooſe an aſſiſtant, a partner, a ſervant, our firſt enquiry is concerning his character. When we have occaſion for a counſellor or attorney, a phyſician or apothecary, whatever we may be ourſelves, we always chooſe to truſt our property and perſons to men of the beſt character. When we fix on the tradeſman who are to ſupply us with neceſſaries, we are not determined by the ſign of the lamb, or the wolf, or the fox; nor by a ſhop fitted up in the moſt elegant taſte, but by the faireſt reputation. Look into a daily newſpaper, and you will ſee, from the higheſt to the loweſt rank, how important the characters of the employed appear to the employers. After the advertiſement has enumerated the qualities required in the perſon wanted, there conſtantly follows, that none need apply who cannot bring an undeniable character. Offer yourſelf as a candidate for a ſeat in parliament, be promoted to honour and emolument, or in any reſpect attract the attention of mankind upon yourſelf, and, if you are vulnerable in your character, you will be deeply wounded. This is a general teſtimony in favour of honeſty, which no writings and no practices can poſſibly refute. Young men, therefore, whoſe characters are yet unfixed, and who, conſequently, may render them juſt ſuch as they wiſh, ought to pay great attention to the firſt ſteps which they take on entrance into life. They are uſually careleſs and inattentive to this object. They purſue their own plans with ardour, and neglect the opinions which others entertain of them. By ſome thoughtleſs action or expreſſion, they ſuffer a mark to be impreſſed upon them, which ſcarcely any ſubſequent merit can entirely eraſe. Every man will find ſome perſons, who, though they are not profeſſed enemies, yet view him with an envious or a jealous eye, and who will gladly revive at any tale to which truth has given the ſlighteſt foundation. In this turbulent and confuſed ſcene, where our words and actions are often miſunderſtood, and oftener miſrepreſented, it is indeed difficult even for innocence and integrity to avoid reproach, abuſe, contempt, and hatred. Theſe not only hurts our intereſt and impede our advancement in life, but ſorely afflict the feelings of a tender and delicate mind. It is then the part of wiſdom firſt to do every thing in our power to preſerve an irreproachable character, and then to let our happineſs depend chiefly on the approbation of our intereſt in a world where liars ſhall not be believed, and where ſlanderers ſhall receive countenance from none but him who is called, by way of eminence Διαβολος, *Diabolus*, or the calumniator."

(IV.) CHARACTER, in natural hiſtory, is ſynonymons with the definition of the genera of animals, plants, &c.

(V.) CHARACTER in poetry, particularly the epopee and drama, is the reſult of the manners or peculiarities by which a perſon is diſtinguiſhed from others, § I. *d.* 6. The poetical character ſays Mr Boſſu, is not properly any particular virtue or quality, but a compoſition of ſeveral which are mixed together, in a different degree, according to the neceſſity of the fable and the unity of the action: there muſt be one, however to reign over all the reſt; and this muſt be found, in ſome degree, in every part. The firſt quality in Achilles, is wrath; in Ulyſſes, diſſimulation; and in Æneas, mildneſs: but as theſe characters cannot be alone, they muſt be accompanied with others to embelliſh them, as far as they are capable, either by hiding their defects, as in the anger of Achilles, which is palliated by extraordinary valour; or by making them centre in ſome ſolid virtue, as in Ulyſſes, whoſe diſſimulation makes a part of his prudence; and in Æneas, whoſe mildneſs is employed in a ſubmiſſion to the will of the gods. In the making up of which union, it is to be obſerved, the poets have joined together ſuch qualities as are by nature the moſt compatible; valour with anger, piety with mildneſs, and prudence with diſſimulation. The fable required prudence in Ulyſſes, and piety in Æneas; in this, therefore, the poets were not left to their choice; but Homer might have made Achilles a coward without abating any thing from the juſtneſs of his fable: ſo that it was the neceſſity of adorning his character that obliged him to make him valiant: the character, then, of a hero in the epic poem, is compounded of three ſorts of qualities; the firſt eſſential to the fable; the ſecond, embelliſhments of the firſt; and valour, which ſuſtains the other two, makes the third. Unity of character is as neceſſary as the unity of the fable. For this purpoſe, a perſon ſhould be the ſame from the beginning to the end: not that he is always to betray the ſame ſentiments, or one paſſion; but that he ſhould never ſpeak nor act inconſiſtently with his fundamental character. For inſtance, the weak may ſometimes ſally into a warmth, and the breaſt of the paſſionate be calm, a change which often introduces in the drama a very affecting variety; but if the natural diſpoſition of both act out of character, and contradict their perſons. True characters are ſuch as we really ſee in men, or may exiſt without any contradiction to nature: no man queſtions but there have been men as generous and pious as Æneas, as paſſionate and violent as Achilles, as prudent and wiſe as Ulyſſes, as impious and atheiſtical as Mezentius, and as amorous and paſſionate as Dido; all theſe characters, therefore, are true, and nothing but juſt imitations of nature. On the contrary, a character is falſe when an author ſo feigns it, that one can ſee nothing like it in the order of nature. Theſe characters ſhould be wholly excluded from a poem, becauſe, tranſgreſſing the bounds of probability and reaſon, they meet with no belief from the readers; they are fictions of the poet's brain, and not imitations of nature; and yet all poetry conſiſts in an imitation of nature.

* *To* CHARACTER. *v. a.* [from the noun.] To inſcribe; to engrave. It ſeems to have had the accent formerly on the ſecond ſyllable.—

O Roſalind! theſe trees ſhall be my books,
And in their barks my thoughts I'll *character.*
Shakeſpeare.

* CHARACTERISTICALNESS. *n. ſ.* [from *characteriſtical.*] The quality of being peculiar to a character; marking a character.

(1.) * CHARACTERISTICK. CHARACTERISTICAL. *adj.* [from *characterize.*] That which conſtitutes the character, or marks the peculiar properties of any perſon or thing.—There are ſeveral others that I take to have been likewiſe ſuch, to which yet I have not ventured to prefix that *characteriſtick* diſtinction. *Woodward on Foſſils.*—The ſhining quality of an epick hero, his magnanimity, his conſtancy, his patience, his piety, or whatever *characteriſtical* virtue his poet gives him, raiſes our admiration. *Dryden.*

(2.) * CHARACTERISTICK. *n. ſ.* That which conſtitutes the character; that which diſtinguiſhes any thing or perſon from others.—This vaſt invention exerts itſelf in Homer, in a manner ſuperiour to that of any poet; it is the great and peculiar *characteriſtick* which diſtinguiſhes him from all others. *Pope.*

(3.) CHARACTERISTICK, in grammar, the principal letter of a word, which is preſerved in moſt of its tenſes and moods, its derivatives and compounds.

(4.) * CHARACTERISTICK OF A LOGARITHM. The ſame with the *index* or *exponent.*

(5.) CHARACTERISTIC TRIANGLE OF A CURVE, in the higher geometry, is a rectilinear right-angled triangle, whoſe hypothenuſe makes a part of the curve, not ſenſibly different from a right line. It is ſo called, becauſe curve lines are uſed to be diſtinguiſhed hereby. See CURVE.

* *To* CHARACTERIZE. *v. a.* [from *character.*] 1. To give a character or an account of the perſonal qualities of any man.—It is ſome commendation, that we have avoided publickly to *characterize* any perſon, without long experience. *Swift.* 2. To engrave, or imprint.—They may be called anticipations, prenotions, or ſentiments *characterized* and engraven in the ſoul, born with it, and growing up with it. *Hale.* 3. To mark with a particular ſtamp or token.—There are faces not only individual, but gentilitious and national; European, Aſiatick, Chineſe, African, and Grecian faces are *characterized. Arbuthnot on Air.*

* CHARACTERLESS. *adj.* [from *character.*] Without a character.—

When water drops have worn the ſtones of
Troy,
And blind oblivion ſwallowed cities up,
And mighty ſtates *characterleſs* are grated
To duſty nothing. *Shakeſpeare.*

* CHARACTERY. *n. ſ.* [from *character.*] Impreſſion; mark; diſtinction: accented anciently on the ſecond ſyllable.—Fairies uſe flowers for their *charactery. Shakeſpeare.*—

All my engagements I will conſtrue to thee,
All the *charactery* of my ſad brows. *Shakeſp.*

CHARADE, a new ſpecies of literary amuſement. It owes its name to the idler who invented it. Its ſubject muſt be a word of two ſyllables, each forming a diſtinct word; and theſe two ſyllables muſt be concealed in an enigmatical deſcription, firſt ſeparately, and then together. Charades, if not inſtructive, are at leaſt innocent, and may afford a harmleſs amuſement to thoſe who are otherwiſe at a loſs to *kill time.* And as they have made their way into every faſhionable circle, and employed even Garrick himſelf, we ſhall give one example in proſe, and another in verſe, by way of ſpecimen: I. My *firſt*, is plowed for various reaſons, and grain is frequently buried in it to little purpoſe. My *ſecond*, is neither riches nor honours; yet the former would generally be given for it, and the latter are often taſteleſs without it. My *whole* applies equally to ſpring, ſummer, autumn, and winter; and both fiſh and fleſh, praiſe and cenſure, mirth and melancholy, are the better for being in it.—SEA-SON.

II. My *firſt* is called bad or good,
May pleaſe or offend ye;
My *ſecond*, in a thirſty mood,
May very much befriend ye.
My *whole*, tho' ſtyled a cruel word,
May yet appear a kind one;
It often may with joy be heard,
With tears may often blind one. FARE-WELL.

CHARADRIUS, in ornithology, a genus belonging to the order of grallæ. The beak is cylindrical and blunt; the noſtrils are linear; and the feet have 3 toes. There are about 16 ſpecies of which the following are the moſt remarkable

1. CHARADRIUS ÆGYPTIUS, the Egyptian Dotterel, has a black ſtreak on the breaſt, white eyebrows, the prime tail feathers ſtreaked with black at the points, and bluiſh legs. It is found in the plains of Egypt, and feeds on inſects.

2. CHARADRIUS ALEXANDRINUS, the Alexandrian Dotterel, is of a browniſh colour, with the forehead, collar, and belly white; the prime tail feathers on both ſides are white; and the legs are black. It is about the ſize of a lark, and lives upon inſects.

3. CHARADRIUS APRICARIUS, the *ſpotted plover* of Edwards, has a black belly; the body is brown, and variegated with white and yellow ſpots; and the legs are aſh-coloured. It is a native of Canada.

4. CHARADRIUS CALIDRIS has black feet, and a black bill; the rump is greyiſh; and the body is pure white below. It frequents the ſhores of Europe.

5. CHARADRIUS HIATICULA, the *ſea lark* of Ray, has a black breaſt; a white ſtreak along the front; the top of the head is brown; and the legs and beak are reddiſh. They are found on the ſhores of Europe and America; and frequent our ſhores in ſummer, but are not numerous. They lay four eggs of a dull whitiſh colour, ſparingly ſprinkled with black: at the approach of winter they diſappear.

6. CHARADRIUS HIMANTOPUS, the *autumnal dotterel*, is white below, with a black back, and a long black bill; the feet are red and very long. It frequents the ſea-ſhores of Europe, and is found in the lakes of Egypt in October.

7. CHARADRIUS MORINELLUS, the *Dotterel* of Ray, has an iron-coloured breaſt, a ſmall white ſtreak on the breaſt and eye-brows, and black legs. It is a native of Europe, and is found in the counties of Cambridge, Lincoln, and Derby. On Lincoln heath, and the moors of Derby, they are migratory; appearing in ſmall flocks of 8 or 10 only

in the end of April, and continuing all May and part of June; during which time they are very fat, and much eſteemed for their delicate flavour. In the months of April and September, they are taken on the Wiltſhire and Berkſhire downs: they are alſo found in the beginning of April on the ſea-ſide at Mealeas in Lancaſhire, and continue there about 3 weeks, attending the barley fallows: from thence they remove northward to Leyton Haws, and ſtay there about a fortnight; but where they breed, or reſide during winter, we have not been able to diſcover. They are reckoned very fooliſh birds, ſo that a dull fellow is proverbially ſtyled a *dotterel*. They were alſo believed to mimic the action of the fowler, ſtretching out a wing when he ſtretches out an arm, &c. continuing their imitation, regardleſs of the net ſpreading for them.

8. Charadrius Œdicnemus, the *ſtone curlew* of Ray, is of a grey colour, with two of the prime wing feathers black, but white in the middle: it has a ſharp bill, and aſh-coloured feet; and is about the ſize of a crow. In Hampſhire, Norfolk, and on Lincoln heath, it is called the ſtone curlew, from a ſimilarity of colours to the curlew. It breeds in ſome places in rabbit burrows; alſo among ſtones on the bare ground, laying two eggs of a copper colour ſpotted with a darker red. The young run ſoon after they are hatched. Theſe birds feed in the night on worms and caterpillars: they will alſo eat toads, and catch mice. They inhabit fallow lands and downs; affect dry places, never being ſeen near any waters. When they fly, they extend their legs ſtraight out behind: are very ſhy; run far before they take wing, and often ſquat: are generally ſeen ſingle; and are eſteemed very delicate food.—Haſſelquiſt informs us, that this ſpecies is alſo met with in Lower Egypt, in the Acacia groves, near the villages Abuſir and Sackhara, near the ſepulchres of the ancient Egyptians, and in the deſarts. The Arabians call it Kervan. It has a ſhrill voice, ſomewhat reſembling that of the black woodpecker, which it raiſes and lowers ſucceſſively, uttering agreeable notes. The Turks and Egyptians value it much, if they can get it alive; and keep it in a cage for the ſake of its ſinging. Its fleſh is hard, and of a very good taſte, inclined to aromatic. It is a very voracious bird, catching and devouring rats and mice, which abound in Egypt. It ſeldom drinks; and when taken young, and kept in a cage in Egypt, they give it no water for ſeveral months, but feed it with freſh meat macerated in water, which it devours very greedily. It is found in deſarts, and is therefore accuſtomed to be without water.

9. Charadrius Pluvialis, the *green plover* of Ray, is black above, with green ſpots, white underneath, and the feet are aſh-coloured. It is a native of Europe. They lay 4 eggs, ſharply pointed at the leſſer end, of a dirty white colour, and irregularly marked, eſpecially at the thicker end, with blotches and ſpots. It breeds on ſeveral of our unfrequented mountains; and is very common on thoſe of the iſle of Rum, and others of the loftier Hebrides. They make a ſhrill whiſtling noiſe; and may be enticed within a ſhot by a ſkilful imitator of the note.

10. Charadrius Spinosus, the *lapwing*, or armed dotterel, has black breaſt, legs, and wings; with a creſt on the hinder part of the head. It is of the ſize of a pidgeon; the French call it *dominicanus*, from the reſemblance it has to the dreſs of a Dominican monk. It is a native of Egypt.

11. Charadrius Torquatus has a black breaſt, and a white front; the top of the head and the collar is black; and the beak and feet are bluiſh. It is a native of St Domingo.

12. Charadrius Vociferus, the *noiſy plover* of Cateſby, has black ſtreaks on the breaſt, neck, forehead, and cheeks; and the feet are yellow. It is a native of North America.

13. Charadrius Zelandicus, the *New Zealand plover*, has the fore part of the head, the eye, chin, and throat, black, paſſing backwards in a collar at the hind head; all the back part of the head, behind the eye, greeniſh aſh-colour; theſe two colours divided by white: the plumage on the upper parts of the body is the ſame colour as the back of the head: the quills and tail are duſky: the laſt order of coverts is white for ſome part of their length, forming a bar on the wing: the under parts of the body are white; and the legs red. It inhabits Queen Charlotte's ſound; where it is known by the name of Doodooroa attoo. See *Plate* I. *fig*. 6.

CHARAG, the tribute which Chriſtians and Jews pay to the grand ſignior. It conſiſts of 10, 12, or 15 francs per annum, according to the ſtate of the party. Men begin to pay it at from 9 to 16 years old; women are diſpenſed with, as are alſo prieſts, rabbins, and religious.

CHARAIMS, a ſect of the Jews in Egypt, who live by themſelves, and have a ſeparate ſynagogue; ſaid to be the deſcendants of the ancient Essenes. They are remarkable for large noſes, which run through all the families of this ſect. They ſtrictly obſerve the law of Moſes, according to the letter; and receive no written traditions. It is ſaid that the other Jews would join the *Charaims*; but thoſe not having obſerved the exact law with regard to divorces, theſe think they live in adultery.

CHARAN-MURAN. See Amur.

CHARANTIA, in botany. See Momordica.

CHARASM, a fertile country of Aſia, bounded on the N. by Turkeſtan, E. by Great Buckaria, S. by Choraſan, and W. by the Caſpian ſea. It is divided among ſeveral Tartarian princes, of whom one takes the title of khan, with a degree of pre-eminence over the reſt; and he is ſaid to be able to raiſe an army of 50,000 horſemen Urgantz is the capital, and the uſual reſidence of the khan in winter, but during the ſummer he generally encamps on the banks of the river Amol; and as his camp is called Khiva, the people have generally been called the Tartars of Khiva.

CHARBON, in the manege, the little black ſpot or mark which remains after a large ſpot in the cavity of the corner teeth of a horſe. About the 7th or 8th year, when the cavity fills up, the tooth being ſmooth and equal, it is ſaid to be raſed.

CHARBOROUGH, a town in Dorſetſhire, S. W. of Winbourn Minſter.

CHARCAS, or Charcos, the ſouthern diviſion of Peru in South America, remarkable for the ſilver mines of Potosi. La Plata and Potoſi are the chief towns in this province.

(1.) * CHARCOAL. *n. ſ.* [imagined by *Skinner* to be derived from *char*, buſineſs; but, by Mr *Lye*, from *To chark*, to burn.] Coal made by burning wood under turf. It is uſed in preparing metals.—Seacoal laſts longer than *charcoal*; and *charcoal* of roots, being coaled into great prices, laſts longer than ordinary *charcoal*. *Bacon's Nat. Hiſt.*

Love is a fire that burns and ſparkles,
In man as naturally as in *charcoals*,
Which ſooty chymiſts ſtop in holes,
When out of wood they extract coals. *Hudibr.*

Is there, who, lock'd from ink and paper, ſcrawls
With deſp'rate *charcoal* round his darken'd walls? *Pope.*

(2.) Charcoal, astonishing porousness and durability of. Charcoal conſiſts of wood half burnt, and is chiefly uſed where a clear ſtrong fire, without ſmoke, is required; the humidity of the wood being moſtly diſſipated, in the fire wherein it is prepared. The microſcope diſcovers a ſurpriſing number of pores in charcoal. They are diſpoſed in order, and traverſe it lengthwiſe; ſo that there is no piece of charcoal, how long ſoever, but may be eaſily blown through. If a piece be broken pretty ſhort, it may be ſeen through with a microſcope. In a range the 18th part of an inch long, Dr Hook reckoned 150 pores; whence he concludes, that in a charcoal of an inch diameter, there are not leſs than 5,724,000 pores. It is to this prodigious number of pores, that the blackneſs of charcoal is owing: for the rays of light ſtriking on the charcoal, are abſorbed in its pores, inſtead of being reflected; whence the body muſt of neceſſity appear black. See Black, § 3, and Blackness, § 2. Charcoal was anciently uſed to diſtinguiſh the bounds of eſtates and inheritances; as being incorruptible, when let very deep within ground. In fact it laſts ſo long, that there are many pieces found entire in the ancient tombs of the northern nations. M. Dodart ſays, there is charcoal made of corn, properly as old as the days of Cæſar: he adds, that it has kept ſo well, that the wheat may be ſtill diſtinguiſhed from the rye; which he looks on as a proof of its incorruptibility.

(3.) Charcoal, methods of making. The wood intended for charcoal is cut into proper lengths, and piled up in heaps near the place where it is to be made. When a ſufficient quantity is thus prepared, it is conſtructed in ſtacks, for which there are 3 methods. I. The firſt is this: They level a proper ſpot of ground, of about 12 or 15 feet in diameter, near the piles of wood; in the centre of this area a large billet of wood, ſplit acroſs at one end and pointed at the other, is fixed with its pointed extremity in the earth, and two pieces of wood inſerted through the clefts of the other end, forming 4 right angles; againſt theſe croſs pieces 4 other billets of wood are placed, one end on the ground, and the other leaning againſt the angles. A number of large and ſtraight billets are then laid on the ground to form a floor, each being as it were the radius of the circular area: on this floor a proper quantity of ſmall wood is ſtrewed, to fill up the interſtices, when the floor will be complete. To keep the billets in the ſame order and poſition in which they were firſt arranged, pegs are driven into the ground in the circumference of the circle, about a foot diſtant from one another: upon this floor a ſtage is built with billets ſet upon one end, but ſomething inclining towards the central billet; and on the tops of theſe another floor is laid in a horizontal direction, but of ſhorter billets, as the whole is, when finiſhed, to form a cone. II. The 2d method is performed thus: A long pole is erected in the centre of the area, and ſeveral ſmall billets ranged round the pole on their ends: the interſtices between theſe billets and the pole is filled with dry bruſh-wood; then a floor is laid, on that a ſtage in a reclining poſition, and on that a 2d floor, &c. as deſcribed above; but in the lower floor there is a billet larger and longer than the reſt, extending from the central pole to ſome diſtance beyond the circumference of the circle. III. The 3d method is this: An aperture of a ſquare form, is built with billets in the centre, from the bottom to the top; and round theſe, floors and inclined ſtages are erected, in the ſame manner as in the ſtacks, except that the baſe of this, inſtead of being circular, is ſquare; and the whole ſtack, when completed, forms a pyramid. The ſtack in any of theſe forms, being thus finiſhed, is coated over with turf, and the ſurface plaſtered with a mixture of earth and charcoal duſt well tempered together. The next operation is the ſetting the ſtack on fire. If it be of the firſt conſtruction, the central billet in the upper ſtage is drawn out, and ſome pieces of very dry and combuſtible wood are placed in the void ſpace, called by workmen, the *chimney*, and fire ſet to theſe pieces. If the ſtack be of the 2d conſtruction, the central pole is drawn out, with the large horizontal billet, and the void ſpace occupied by the latter being filled up with pieces of very dry combuſtible wood, the fire is applied to it at the baſe of the ſtack. In the 3d conſtruction, the ſquare aperture is filled with ſmall pieces of very dry wood, and the fire applied to it at the top of the pyramidal ſtack. When the ſtack is ſet on fire, either at the top or bottom, the greateſt attention is neceſſary in the workman; for in the proper management of the fire the chief difficulty attending the art of making good charcoal conſiſts. Care muſt be taken, as ſoon as the flame begins to iſſue ſome height above the chimney, that the aperture be covered with turf, but not ſo cloſe as to hinder the ſmoke from paſſing out: and whenever the ſmoke iſſues very thick from any part of the pile, the aperture muſt be covered with a mixture of earth and charcoal duſt. As it is neceſſary that every part of the ſtack ſhould be equally burnt, it is requiſite for the workman to open vents in one part and ſhut them in another. In this manner the fire muſt be kept up till the charcoal be ſufficiently burnt, which will happen in about two days and a half, if the wood be dry; but if green, the operation will not be finiſhed in leſs than 3 days. When the charcoal is ſufficiently burnt, which is eaſily known from the appearance of the ſmoke, and the flames no longer iſſuing with impetuoſity through the vents; all the apertures muſt be cloſed up carefully with a mixture of earth and charcoal duſt, which, by excluding all acceſs of the external air, prevents the coals from being any further conſumed, and the fire goes out. In this condition it is allowed to remain, till the whole is ſufficiently cooled: when the cover is removed, and the charcoal is taken away. If the whole proceſs is ſkilfully managed, the coals will exactly retain the figure of the pieces of wood: ſome are ſaid to have been ſo dexterous as to char an arrow, without altering even the figure of the feather.

(4.) CHARCOAL OF DIFFERENT SUBSTANCES. There are conſiderable differences in the charcoals of different vegetables, in regard to their habitude to fire. The very light coals of linen, cotton, ſome fungi, &c. readily catch fire from a ſpark, and ſoon burn out; the more denſe ones of woods and roots are ſet on fire more difficultly, and burn more ſlowly. The coals of the black berry-bearing alder, of the hazel, the willow, and the lime tree, are ſaid to anſwer beſt for the making of gunpowder and other pyrotechnical compoſitions, perhaps from their being eaſily inflammable. For the reduction of metallic calces, thoſe of the heavier woods, as the oak and the beech, are preferable, theſe ſeeming to contain a larger proportion of the phlogiſtic principle, and that, perhaps, in a more fixed ſtate. As common fuel, thoſe of the heavy woods give the greateſt heat, and require the moſt plentiful ſupply of air to keep them burning; thoſe of the light woods preſerve a glowing heat, without much draught of air, till the coals themſelves are conſumed; the bark commonly crackles and flies about in burning, which the coal of the wood itſelf very ſeldom does. Horns and the bones both of fiſhes and land animals, afford charcoal rather gloſſier and deeper coloured than vegetables; and which, in general, are very hard, ſo as difficultly, or not at all, to ſtain paper. The hardneſs of the coal ſeems to depend on that of the ſubject from whence it was prepared; for ſilk, woollen, leather, blood, and the fleſhy parts of animals, yield ſoft coals. Some of theſe differ from others very ſenſibly in colour: that of ivory is ſuperior to all the reſt, and indiſputably the fineſt of all the charcoal blacks. The animal coals have much leſs of the bluiſh caſt in them than the vegetable, many of them inclining rather to a brown. Charred pit-coal, on the other hand, ſeems to have this blueneſs in a greater degree. See § 8.

(5.) CHARCOAL OF METALS. The moſt extraordinary modern diſcovery concerning this ſubſtance is that of Dr Prieſtley, who has found that ſeveral of the metals may be converted into charcoal, by paſſing the ſteam of ſpirit of wine over them when red-hot; and this, by way of diſtinction, he calls the *charcoal of metals*. This ſurpriſing diſcovery was made accidentally, while the Dr was repeating the experiments by which M. Lavoiſier imagined water might be converted into air. Having tranſmitted the ſteam of water through a copper tube, on which it had no effect, he wiſhed to try the effects of that of other fluids; and for this purpoſe made choice of ſpirit of wine, having before procured inflammable air by ſending the ſame ſteam through a red-hot tobacco pipe. No ſooner had the vapour of this fluid, however, touched the red-hot copper, than he was aſtoniſhed at the rapid production of air from it, which reſembled the blowing of a pair of bellows; and before 4 ounces of the ſpirit were expended, the tube was perforated in 2 or 3 places. In a moment after it was ſo far deſtroyed, that it fell to pieces on attempting to remove it from the fire; the inſide being filled with a black matter reſembling lamp black. Having now recourſe to earthen tubes, the Dr found, that, by melting copper and other metals in them, and tranſmitting the vapour of ſpirit of wine in contact with them while in a ſtate of ignition, different ſubſtances were formed according to the metals employed. On ſending 3 ounce meaſures of ſpirit of wine over 2 ounces of copper, the metal loſt 28 grains of its weight, and 446 grains of charcoal were procured, chiefly in the form of powder, though ſome of it was in large flakes ſeveral inches long; having ſeparated at once from the ſurface of the melted metal. Theſe pieces were almoſt quite black, and bore handling without any danger of being broken. In another experiment, 508 grains of charcoal were obtained from 19 grains of copper; but here the metal had been previouſly reduced to thin plates, and they were not all converted into charcoal, being ſomething harder, and therefore partially metallic in the middle. Silver was found to be affected very much as copper had been; but the larger maſſes of charcoal procured from this metal were much whiter than thoſe from copper. Only a ſmall quantity of charcoal could be procured from lead. Three ounce meaſures of ſpirit of wine and near 4 ounces of lead, gave only a ſmall quantity of whitiſh powdery ſubſtance, though 58 grains of the lead were miſſing; but the inſide of the glaſs tube, through which the air was tranſmitted, became very black. The like quantity of ſpirit of wine ſent over 360 grains of melted tin, and produced 26 grains of black duſt; the metal not being diminiſhed quite 4 grains. The vapour of two ounce meaſures of ſpirit of wine, ſent over 960 grains of iron ſhavings diminiſhed the metal only two grains; but no charcoal could be collected, though the air was loaded with black particles. The iron had acquired a dark blue colour. Gold was not ſenſibly changed or diminiſhed in weight; and it not only remained unalterable by the proceſs itſelf, but effectually protected a 10th part of its weight of copper from the action of the ſteam. Spirit of turpentine was found to anſwer for the production of this charcoal, as well as ſpirit of wine; 120 grains of the former being obtained from 5 of copper by means of the turpentine, notwithſtanding a very denſe black ſmoke, which iſſued from the end of the tube during the whole time of the operation. The Dr obſerves, indeed, that in all theſe experiments, where the heat is very great, the minute diviſion and volatility of this charcoal is very extraordinary. Seeing it iſſue from the end of a tube in a denſe black cloud, he endeavoured to collect it in a large glaſs receiver; but after having given the glaſs a very thin black coating, not diſtinguiſhable in appearance from ſoot, it iſſued from the orifice like denſe ſmoke, and appeared to be altogether incoercible, even when ſeveral adapters were connected with the receiver, and a tube, from whence it finally iſſued, plunged deep into water. A pretty ſtrong proof of the identity of metallic calces with charcoal, is their converſion into it in the manner already related. Experiments, however, are yet wanting on the ſubject; though it ſeems probable from what Dr Prieſtley has already done, that they may thus be entirely diſſipated into air as well as common charcoal.

(6.) CHARCOAL, PROPERTIES OF. Charcoal is not ſoluble in any of the acids; but may be diſſolved in conſiderable quantities by a ſolution of *hepar ſulphuris*, to which it communicates a green colour. Melted with colourleſs fritt or glaſſes, it gives a pale yellow, dark yellow, reddiſh, browniſh, or blackiſh colour, according as the inflammable matter is in greater or leſs proportion; the phlogiſton, or inflammable matter of the coal ſeeming to be the direct tinging ſubſtance. When the phlogiſtic matter is thus diffuſed through glaſs, it is no more affected by continued ſtrong fire, than charcoal is when excluded from the air. The vapour of burning charcoal is found to be highly noxious, being no other than FIXED AIR. How this affects the animal ſyſtem is explained under the article BLOOD, § 13. From ſome late experiments it appears, that charcoal poſſeſſes many extraordinary properties, altogether unſuſpected by former chemiſts. It has particularly a great attraction for what is called *phlogiſton*, or rather for any kind of oily matter with which other ſubſtances may be ſullied; ſo that it now promiſes to be very uſeful in the arts, in various ways never thought of before. M. Lowits has found, that it is uſeful in preparing chryſtals of tartar of a very white colour; and that the marine and nitrous acids are decompoſed by being diſtilled upon it: the red juices of vegetable fruits are diſcoloured, without loſing any of their acidity; brown rancid oils are rendered ſweet and clear by agitating them for ſome days with charcoal in powder; it changes the ſmell of putrid vegetables to that of a pure volatile alkali; and it produces the ſame effect on freſh meat. On boiling coals in powder with honey, the pure ſaccharine parts of the latter are ſaid to be ſeparated; and the honey to become a well-taſted ſugar: the purification of real ſugar is alſo ſaid to be facilitated by the ſame method. Thus alſo the mother water of the Pruſſian alkali and of the tartareous acid are made to cryſtalize eaſily; terra foliata tartari may be made white without calcination, by previouſly diſtilling the vinegar from coals. Vinegar concentrated by freezing, and diſtilled from a large proportion of powdered coal, is extremely ſtrong, pure, and fragrant. Corn ſpirit merely ſhaken with coal loſes its bad flavour; and if honey is added, it becomes a ſweet and pleaſant liquor. Even when ardent ſpirits are impregnated with any vegetable oils, the flavour is deſtroyed in this way; and if the ſpirit be diſtilled, the reſiduum is ſaid to be brown; ſo that if the diſtillation is not carried too far, no inconvenience enſues. With Peruvian bark a clear decoction was formed, and the reſiduum was a ſalt, in taſte like digeſtive ſalt. Theſe effects were produced by every kind of coal, whether foſſil or charred vegetable ſubſtances. Charcoal has lately been ſeparated from the pureſt ſpirit of wine in the proceſs for making ether; and by M. Lavoiſier is ſuppoſed to be one of the conſtituent parts or elements of that very volatile liquid. See CHEMISTRY, *Index*. Charcoal of wood, when freſh made, has a ſtrong attraction for air, and will continue to abſorb it for a conſiderable time; a property which it has in common with ſeveral other ſubſtances. Dr Prieſtly made ſome experiments to aſcertain the quantity abſorbed. See AEROLOGY, *Index*.

(7.) CHARCOAL, RESULT OF EXPERIMENTS RESPECTING THE COMPOSITION OF. From the days of Stahl till lately, the component parts of this ſubſtance have been reckoned a certain kind of earth combined with what was called phlogiſton. The late experiments of Dr Prieſtly have ſhown, that this doctrine is erroneous, and that charcoal is wholly diſſipable into vapour. "On the whole, ſays Wiegleb, charcoal appears, from the experiments of Lavoiſier and Berthollet, to be an oil deprived of its inflammable gas. But coal of wood likewiſe contains fixed alkali, which the ſoot, or the coal of oil, does not, but inſtead of this exhibits volatile alkali. The fixed alkali of the former proceeds from the plant itſelf, and this, in the caſe of ſoot is joined with inflammable gas, and forms volatile alkali: the earthy part being left behind, as happens when this latter is prepared from fixed alkali. Genuine charcoal, therefore, conſiſts of this vegetable principle, united with a little fixed alkali and part of the phlogiſton that conſtituted the oil of the plant of which it is made; for ſome of this principle is carried off, together with the HYDROPHLOGE, (one of the component parts of water,) in the form of inflammable gas, if diſtilled in cloſe veſſels; but if burned in the open air, the hydrophloge unites with the pure part of the air, and forms water. From theſe conſiderations, as well as from the experiments and obſervations of M. Berthollet, in the *Mem de l' Acad des Sciences*; 1786, p. 33. *et ſeq.* it appears, that common charcoal conſiſts of the vegetable principle, ſome phlogiſton, fixed alkali, and no inflammable gas." All this, however, is entirely diſproved by the experiments of Dr Prieſtly, in which it was totally diſſipated into inflammable air. See AEROLOGY, *Index*. On this occaſion indeed he acknowledges, that ſome very minute particles of aſhes were obſerved, which could not have amounted to a ſingle grain from many pounds of wood; and even theſe may be ſuppoſed to have come from the ſmall quantity of air in the receiver. From undoubted experiments, however, it appears, that charcoal cannot be decompoſed by mere heat; as *in vacuo* it is diſſipated into inflammable air; and this, on preſenting a proper ſubſtance, to attract the ſolid part, again diſcovers itſelf, by its blackneſs, to be real charcoal. As little does it appear deſtructible by burning in the open air; for though ſome aſhes are left, it appears probable, that theſe differ from the coal in nothing but having a quantity of air attached to them. By far the greateſt part of it, even in the common way of burning, is converted into fixed air; and from this it may again be ſeparated by taking the electric ſpark in that fluid, when it is reſolved into very pure dephlogiſticated and inflammable air. The ſame ſeparation may be effected by merely heating iron in fixed air; in which caſe the dephlogiſticated part will unite to the iron, and the coaly part, together with part of the phlogiſton of the metal, be converted into inflammable air. From all theſe, and other conſiderations, a ſuſpicion is induced, that the matter of charcoal is not different from the element of earth itſelf; and that, according to the different modifications of this ſubſtance, it either appears as coal, aſhes, earth of various kinds, or even metals. This receives ſome confirmation from the experiments of Mr Watt, related in the *Philoſ. Tranſ. Vol.* 74.

(8.) **CHARCOAL, USES OF.** Mathematical inſtrument makers, engravers, &c. find charcoal of great uſe to poliſh their braſs and copper plates after they have been rubbed clean with powdered pumice ſtone. Plates of horn are poliſhable in the ſame way, and a gloſs may be afterwards given with tripoli. The coals of different ſubſtances are alſo uſed as pigments; hence the bone black, ivory black, &c. of the ſhops. Moſt of the paints of this kind, beſides their incorruptibility, have the advantage of a full colour, and work freely in all the forms in which powdery pigments are applied; provided they have been carefully prepared, by thoroughly burning in a cloſe veſſel, and afterwards grinding the coal into a powder of due fineneſs. Pieces of charcoal are uſed alſo in their entire ſtate, for tracing the outlines of drawings, &c. in which they have this property, that their mark is eaſily wiped out. For theſe purpoſes, either the finer pieces of common charcoal are picked out and cut to a proper ſhape; or the pencils are formed of wood, and afterwards burnt into charcoal, in a proper veſſel well covered. The artiſts commonly make choice of the ſmaller branches of the tree freed from the bark and pith; and the willow and vine are preferred to all others. This choice is confirmed by the experiments of Dr Lewis, who has found that the wood of the trunks of trees produces charcoal of a harder nature than their ſmall twigs or branches; and the hard woods, ſuch as box and guaiacum, produce coals very ſenſibly harder than the ſofter woods. Willow he prefers to all others. The ſhells and ſtones of fruits yielded coals ſo hard that they would ſcarce mark on paper at all; while the coals of the kernels of fruits were quite ſoft and mellow. The ſeveral coals produced by the doctor's experiments were levigated into fine powder, mixed both with gum water and oil, and applied as paints both thin and thick, and diluted with different degrees of white. All of them, when laid on thick, appeared of a ſtrong full black, nor could it be judged that one was of a finer colour than another; diluted with white, or when ſpread thin, they had all ſomewhat of a bluiſh caſt.

CHARCOS. See CHARCAS.

(1.) **CHARD**, a town in Somerſetſhire, on the ſide of a hill, which is the moſt elevated ſpot between the two ſeas. It is watered by ſeveral ſtreams running through it, particularly one, which being turned to the N. or the S. will run either into the Briſtol or the Britiſh Channel. In the time of Henry III. it was made a free burgh, and ſent members to parliament 9 times, but loſt that privilege by negligence. It has a woollen manufacture, and fairs May 3, Aug. 5, and Nov. 2. It lies 6 miles W. of Crewkerne, and 141 W. by S. of London. Lon. 3. 18. W. Lat. 50. 52. N.

(2.) * **CHARD.** *n. ſ.* [*charde*, Fr.] 1. *Chards* of artichokes are the leaves of fair artichoke plants, tied and wrapped up all over but the top, in ſtraw, during the autumn and winter; this makes them grow white, and loſe ſome of their bitterneſs. *Chambers.* 2. *Chards* of beet, are plants of white beet tranſplanted, producing great tops, which, in the midſt, have a large white, thick, downy, and cotton-like main ſhoot, which is the true *chard*. *Mortimer.*

CHARDIN, Sir John, a celebrated traveller, born at Paris in 1643. His father, who was a jeweller, had him educated in the Proteſtant religion; after which he travelled into Perſia and India. He came to England after the revocation of the edict of Nantes, in 1685; and had the honour of knighthood conferred on him by Charles II. He died at London in 1713. The account he wrote of his travels is much eſteemed,

CHARDSTOCK, a village in Dorſetſh. 2 m. S, from Wambroke. It has a fair on Michaelmas.

CHARELS, E. of Barnſtaple, Devonſhire,

(1.) **CHARENTE**, a department of France, bounded by thoſe of the Two Sevres and Vienne, on the N. Upper Vienne on the E. Dordogne on the S. and Lower Charente (N° 2) on the W. It includes the ci-devant province of Angoumois. Angouleſme is the capital. The air is generally warmer than at Paris, though the country is hilly. The ſoil produces plenty of wheat, rye, oats, Spaniſh corn, ſaffron, grapes, and all ſorts of fruits. It has ſeveral iron mines, which yield a very good ſort of iron.

(2.) **CHARENTE, LOWER**, a department of France, bounded by that of Charente (N° 1.) on the E. Gironde on the S. the Bay of Biſcay on the W. the department of La Vendee on the N. and that of the Two Sevres on the NE. It conſiſts of the ci-devant province of Aunis and Saintonge. Saintes is the capital.

(3.) **CHARENTE**, a river of France, which riſes in the department of Dordogne, and after running through the two departments, (N° 1. and 2.) to which it gives name, and paſſing by Angouleſme, Saintes, and Rochfort, falls into the Bay of Biſcay, oppoſite to the iſle of Oleron. It abounds with excellent fiſh, and often overflows its banks, but inſtead of damaging, it enriches the ſoil.

(1.) **CHARENTON**, a town of France, 4 miles SE. of Paris, ſeated on the Seine, near its confluence with the Marne. In this town the Proteſtants had their principal church, which was demoliſhed upon the revocation of the edict of Nantz. Lon. 2. 25. E. Lat. 48. 45. N.

(2.) **CHARENTON**, a town of France, in the department of Allier, the ci-devant province of Bourbonnois, ſeated on the Marmande.

CHARES the Lydian, a celebrated ſtatuary, was the diſciple of Lyſippus; and made the famous Coloſſus of the ſun in the city of Rhodes. Flouriſhed 288 years before Chriſt.

CHARETTE DE LA COINTRE, Francis Athanaſius de, a brave French royaliſt, born in 1763. He was bred to the navy, and roſe to the rank of lieutenant; but is chiefly famed as the leader of a party of royaliſts in La Vendee. He beheld with indignation the atrocious conduct of the revolutioniſts, and determined to oppoſe them; at the head of an army of Bretons, his atchievements were aſtoniſhing, and he compelled the republicans to enter into a treaty with him, which, with their uſual perfidy they broke, and the war commenced with freſh horrors and various ſucceſs. The weight of numbers at laſt prevailed, and he was defeated in February 1796; in which action he was wounded in the head, beſides having three fingers cut off with a ſabre. He eſcaped from the field of battle, but in a ſhort time after was taken in a wood, and carried to Nantes, where he was ſhot in March following. He refuſed to kneel, but laid open his breaſt, and with a ſpirit undaunted, gave the ſignal for the ſoldiers to fire.

CHARFIELD, a village in Glouceſterſhire, N, of Wickware.

CHARFINCH, W. of Bridgewater, Somerſetſh.

CHARFORD, NORTH, } near Fording-bridge,
CHARFORD, SOUTH. } Hampſhire.

(1.) * CHARGE. *n. ſ.* [from the verb] 1. Care; cuſtody; truſt to defend.—He enquired many things, as well concerning the princes which had the *charge* of the city, whether they were in hope to defend the ſame. *Knolles.* 2. Precept; mandate; command.—Saul might even lawfully have offered to God thoſe reſerved ſpoils, had not the Lord, in that particular caſe, given ſpecial *charge* to the contrary. *Hooker.*—

The leaders having *charge* from you to ſtand,
Will not go off until they hear you ſpeak. *Shak.*

3. Commiſſion; truſt conferred; office.—If large poſſeſſions, pompous titles, honourable *charges*, and profitable commiſſions, could have made this proud man happy, there would have been nothing wanting. *L'Eſtrange.*—

Go firſt the maſter of thy herds to find,
True to his *charge* a loyal ſwain and kind. *Pope.*

4. It had anciently ſometimes *over* before the thing committed to truſt.—I gave my brother *charge over* Jeruſalem; for he was a faithful man, and feared God above many. *Nehemiah.* 5. It has *of* before the ſubject of command or truſt.—

Haſt thou eaten of the tree,
Whereof I gave thee *charge* thou ſhould'ſt not eat? *Milton.*

6. It has *upon* before the perſon charged.—He loves God with all his heart, that is, with that degree of love, which is the higheſt point of our duty, and of God's *charge upon* us. *Taylor's Rule of Living Holy.* 7. Accuſation; imputation.—

We need not lay new matter to his *charge:*
Beating your officers, curſing yourſelves. *Shak.*

8. The perſon or thing entruſted to the care or management of another.—This part ſhould be the governour's principal care; that an habitual graceſulneſs and politeneſs, in all his carriage, may be ſettled in his *charge*, as much as may be, before he goes out of his hands. *Locke.* 9. An exhortation of a judge to a jury; or biſhop to his clergy.—The biſhop has recommended this author in his *charge* to the clergy. *Dryden.* 10. Expence; coſt.—Their *charge* was always born by the queen, and duly paid out of the exchequer. *Bacon.* 11. It is, in later times, commonly uſed in the plural, *charges.*—A man ought warily to begin *charges*, which, once begun, will continue. *Bacon.* 12. Onſet.—Honourable retreats are no ways inferiour to brave *charges;* as having leſs of fortune, more of diſcipline, and as much of valour. *Bacon.* 13. The ſignal to fall upon enemies.—Our author ſeems to ſound a *charge*, and begins like the clangour of a trumpet. *Dryden.* 14. The poſture of a weapon fitted for the attack or combat.—

Their neighing courſers, daring of the ſpur,
Their armed ſtaves in *charge*, their beavers down. *Shakeſpeare.*

15. A load, or burthen.—Aſſes of great *charge.* *Shakeſpeare.* 16. What any thing can bear.—Take of aqua-fortis 2 oz. of quick ſilver 2 drachms, for that *charge* the aqua-fortis will bear, the diſſolution will bear a flint as big as a nutmeg. *Bacon.* 17. The quantity of powder and ball put into a gun. 18. Among farriers.—*Charge* is a preparation or a ſort of ointment, of the conſiſtence of a thick decoction, which is applied to the ſhoulder-ſplaits, inflammations, and ſprains of horſes. A *charge* is of a middle nature, between an ointment and a plaſter, or between a plaſter and a cataplaſm. *Farrier's Dict.* 19. In heraldry.—The *charge* is that which is born upon the colour, except it be a coat divided only by partition. *Peacham.*

(2.) CHARGE, in gunnery. See CHARGING.

(3.) CHARGE, in heraldry, (§ 1. *def.* 19.) is applied to the figures repreſented on the eſcutcheon, by which the bearers are diſtinguiſhed from one another. Too many charges are not ſo honourable as fewer.

(4.) CHARGE, in law. See § 1 *def.* 9. It ſignifies alſo a thing done, that bindeth him who doth it; of which DISCHARGE is the removal. Lands may be charged in various ways; as, by grant of rent out of them; by ſtatutes, judgments, conditions, warranties, &c.

(5.) CHARGE, In painting, or rather *Overcharge*, is an exaggerated repreſentation of any perſon; wherein the likeneſs is preſerved, but at the ſame time ridiculed. The method is, to heighten ſomething already amiſs in the face, whether by way of defect, or redundancy: thus, *e. g.* if a man has a noſe a little larger than ordinary, the painter makes the noſe extravagantly long: or if the noſe be naturally too ſhort, in the painting it will be a mere ſtump; and ſo of the other parts.

(6.) CHARGE OF HORNING, in Scots law. See HORNING.

(7.) CHARGE OF LEAD, 36 pigs. See PIG.

(8.) CHARGE TO ENTER HEIR, in Scots law, a writing under the ſignet, obtained at the inſtance of a creditor, either againſt the heir of his debtor, for fixing upon him the debt as repreſenting the debtor, which is called a *general charge:* or, againſt the debtor himſelf, or his heir, for the purpoſe of veſting him in the right of any heritable ſubject to which he has made up no title, in order the creditor may attach that ſubject for payment of his debt, in the ſame manner as if his debtor or his heir were legally veſted in it by ſervice or otherwiſe. This laſt is called a *ſpecial charge.*

(1.) * *To* CHARGE. *v. a.* [*charger*, Fr. *caricare*, Ital. from *carrus*, Lat.] 1. To entruſt; to commiſſion for a certain purpoſe: it has *with* before the thing entruſted.—And the captain of the guard *charged* Joſeph *with* them, and he ſerved them. *Geneſis.*—What you have *charged* me *with*, that I have done. *Shakeſp.* 2. To impute as a debt: with *on* before the debtor.—

My father's, mother's, brother's death, I pardon:
That's ſomewhat ſure; a mighty ſum of murder,
Of innocent and kindred blood ſtruck off,
My prayers and penance ſhall diſcount for theſe,
And beg of Heav'n to *charge* the bill *on* me.
Dryden.

3. To impute as a crime: with *on* before that to which any thing is imputed.—

Perverſe mankind! whoſe wills, created free,
Charge all their woes *on* abſolute decree:
All to the dooming gods their guilt tranſlate,
And follies are miſcall'd the crimes of fate. *Pope.*

—We *charge* that *upon* neceſſity, which was really deſired and choſen. *Watt's Logick.* 4. To impute to, as coſt, or hazard.—He was ſo great an encourager of commerce, that he *charg'd* himſelf with all the ſea riſk of ſuch veſſels as carried corn to Rome in winter. *Arbuthnot on Coins.* 5. To impoſe as a taſk: it has *with* before the thing impoſed.—The goſpel *chargeth* us *with* piety towards God, and juſtice and charity to men, and temperance and chaſtity in reference to ourſelves. *Tillotſon.* 6. To accuſe; to cenſure.—Speaking thus to you, I am ſo far from *charging* you as guilty in this matter, that I can ſincerely ſay, I believe the exhortation wholly needleſs. *Wake.* 7. To accuſe; it has *with* before the crime.—And his angels he *charged with* folly. *Job.* 8. To challenge.—The prieſt ſhall *charge* her by an oath. *Numbers.* 9. To command; to enjoin.—

I may not ſuffer you to viſit them;
The king hath ſtrictly *charg'd* the contrary.
Shakeſpeare.

10. To fall upon; to attack.—

The Grecians rally, and their pow'rs unite;
With fury *charge* us, and renew the fight. *Dryd.*

11. To burden; to load.—Meat ſwallowed down for pleaſure and greedineſs, only *charges* the ſtomach, or fumes into the brain. *Temple.*—A fault in the ordinary method of education, is the *charging* of children's memories with rules and precepts *Locke.*—

The brief with weighty crimes was *charged*,
On which the pleader much enlarg'd. *Swift.*

12. To cover with ſomething adventitious.—It is pity the obeliſks in Rome had not been *charged* with ſeveral parts of the Egyptian hiſtories, inſtead of hieroplyphicks. *Addiſon.* 13. To fix, as for fight. Obſolete.—He rode up and down, gallantly mounted, and *charged* and diſcharged his lance. *Knolles.* 14. To load a gun with powder and bullets.

(2.) * *To* CHARGE. *v. n.* To make an onſet.—Like your heroes of antiquity, he *charges* in iron, and ſeems to deſpiſe all ornament, but intrinſick merit. *Granville.*

* CHARGEABLE. *adj.* [from *charge.*] 1. Expenſive; coſtly.—Divers bulwarks were demoliſhed upon the ſea-coaſts, in peace *chargeable*, and little ſerviceable in war. *Hayward.*—Neither did we eat any man's bread for nought, but wrought with labour and travel night and day, that we might not be *chargeable* to any of you. 2 *Theſſ.* 2. Imputable, as a debt or crime: with *on.*—Nothing can be a reaſonable ground of deſpiſing a man, but ſome fault or other *chargeable upon* him. *South.* 3. Subject to charge or accuſation; accuſable: followed by *with.*—Your papers would be *chargeable with* ſomething worſe then indelicacy; they would be immoral. *Spect.*

* CHARGEABLENESS. *n. ſ.* [from *chargeable.*] Expence; coſt; coſtlineſs.—That which moſt deters me from ſuch trials, is not their *chargeableneſs*, but their unſatisfactorineſs, though they ſhould ſucceed. *Boyle.*

* CHARGEABLY. *adv.* [from *chargeable.*] Expenſively; at great coſt.—He procured it not with his money, but by his wiſdom; not *chargeably* bought by him, but liberally given by others by his means. *Aſcham.*

(1.) CHARGED, in electrical experiments, is applied to a vial, or any thing properly coated, which has a quantity of electricity communicated to it. See ELECTRICITY.

(2.) CHARGED, in heraldry: a ſhield carrying ſome impreſs or figure, is ſaid to be charged therewith; and when one bearing, has another figure added upon it, it is ſaid to be charged.

* CHARGEFUL. *adj.* [*charge* and *full.*] Expenſive; coſtly. Not in uſe.—

Here's the note
How much your chain weighs to the utmoſt 'carot,
The fineneſs of the gold, the *chargeful* faſhion.
Shak.

* CHARGER. *n. ſ.* [from *charge.*] A large diſh.—

All the tributes land and ſea affords,
Heap'd in great *chargers*, load our ſumptuous boards. *Denham.*

CHARGING OF GUNS. The rules for charging large pieces in war are, That the piece be firſt cleaned or ſcoured withinſide: that the proper quantity of powder be next driven in and rammed down; care, however, being taken, that the powder, in ramming, be not bruiſed, becauſe that weakens its effect: that a little quantity of paper, hay, lint, or the like, be rammed over it; and that the ball or ſhot be intruded. If the ball be red hot, a tompion, or trencher of green wood, is to be driven in before it. The common allowance for a charge of powder of a piece of ordnance, is half the weight of the ball. In the Britiſh Navy, the allowance for 32 pounders is but ſeven 16ths of the weight of the bullet. But a late author is of opinion, that if the powder in all ſhip cannon whatever was reduced to $\frac{1}{3}$ weight of the ball, or even leſs, it would be of conſiderable advantage, not only by ſaving ammunition, but by keeping the guns cooler and quieter, and at the ſame time more effectually injuring the veſſels of the enemy. With the preſent allowance of powder the guns are heated, and their tackle and furniture ſtrained; and this only to render the bullets leſs efficacious: for a bullet which can but juſt paſs through a piece of timber, and loſes almoſt all its motion thereby, has a much better chance of rending and fracturing it, than if it paſſes through with a much greater velocity. The charge ſhould not be determined by the greateſt velocity that may be produced, but it ſhould be ſuch a quantity of powder as will produce the leaſt velocity neceſſary for the purpoſe in view; and if the wind-edge be moderate, no field-piece ſhould ever be loaded with more than one-ſixth, or at the moſt one-fifth, of the weight of its ball in powder; nor ſhould the charge of any battering piece exceed one 3d of the weight of its bullet. Different charges of powder, with the ſame weight of ball, produce different velocities in the ball, which are in the ſame ſubduplicate ratio of the weights of powder; and when the weight of powder is the ſame, and the ball varied, the velocity produced is in the reciprocal ſubduplicate ratio of the weight of the ball; which is agreeable both to theory and practice. *Phil. Trans.* 1778, and *Hutton's Tracts*, vol. i. This, however, ſuppoſes that the gun is of an indefinite length; whereas, on account of the limited length of guns, there is ſome variation from this law both in practice and theory; from which it appears that the velocity of the ball increaſes with the charge only to a certain point, which is peculiar to each gun, where the velocity is the greateſt; and that by farther increaſing the charge, the velocity diminiſhes in proportion till the bore is quite full of powder. The charge producing the greateſt velocity ought to be about $\frac{1}{8}$ of the length of the bore of the gun; but for ſeveral reaſons in practice, this charge, in proportion as the gun is longer, falls ſhort of producing the greateſt velocity; and from numerous experiments it is found, that the charge producing the greateſt velocity, in guns of different lengths of bore, from 15 to 40 calibers, is as follows: When the bore is 15 calibers, the proportionate charge is three 30ths, when 20, three 12ths, 30, three 16ths, and when 40, three 20ths.

CHARIDEMUS, an Athenian, who was baniſhed from Athens by order of Alexander the Great; whereupon he fled to Darius, and being an excellent ſoldier did conſiderable ſervice to the Perſians againſt the Greeks.

CHARIENTISMUS, in rhetoric, a figure wherein a taunting expreſſion is ſoftened by a jeſt.

CHARILA, a feſtival obſerved once in nine years by the Delphians. It took its riſe from this circumſtance: During a great famine, the people of Delphi aſſembled and applied to their king to relieve their wants; when he accordingly diſtributed the little corn he had among the nobleſt; but as a poor little girl called *Charila*, begged the king with more than common earneſtneſs, he beat her with his ſhoe, and the girl, unable to bear his treatment, hanged herſelf in her girdle. The famine increaſed; and the oracle told the king, that to relieve his people, he muſt atone for the murder of Charila; upon which a feſtival was inſtituted with expiatory rites. The king preſided over this inſtitution, and diſtributed pulſe and corn to ſuch as attended: Charila's image was brought before the king, who ſtruck it with his ſhoe; after which it was carried to a deſolate place, where they put a halter round its neck, and buried it where Charila was buried.

* CHARILY. *adv.* [from *chary.*] Warily; frugally.—What paper do you take up ſo *charily.* *Shak.*

* CHARINESS. *n. ſ.* [from *chary.*] Caution; nicety; ſcrupulouſneſs.—I will conſent to act any villany againſt him, that may not ſully the *charineſs* of our honeſty. *Shak.*

CHARING, a town in Kent, between Lenham and Weſtwell, ſeated on a ſpring head of the river Len, on the S. of the road from Maidſtone to Canterbury. It has the ruins of a caſtellated palace of the archbiſhops, built in the time of the Saxon kings. It has fairs, May 1, and Oct. 29.

CHARINGWORTH, a village in Glouceſterſhire, near Ibberton.

(1.) * CHARIOT. *n. ſ.* [*car-rhod*, Welch, a wheeled car; for it is known the Britons fought in ſuch; *charriot*, Fr. *carretta*, Ital.] 1. A wheel carriage of pleaſure, or ſtate; a vehicle for men rather than wares.—

> Thy Grand captain Antony
> Shall ſet thee on triumphant *chariots*, and
> Put garlands on thy head. *Shak.*

2. A car in which men of arms were anciently placed.—

> He ſkims the liquid plains,
> High on his *chariot*, and with looſen'd reins,
> Majeſtick moves along. *Dryden.*

3. A lighter kind of coach with only front ſeats.

(2.) CHARIOTS, (§ 1. *def.* 2.) in antiquity, were chiefly uſed in war, and called BIGÆ, TRIGÆ, &c. according to the number of horſes applied to draw them. Every chariot carried two men, who were probably the warrior and the charioteer; and we read of ſeveral men of note and valour employed in driving the chariot. When the warriors came to encounter in cloſe fight, they alighted out of the chariot, and fought on foot; but when weary, which often happened by reaſon of their armour, they retired into their chariot, and thence annoyed their enemies with darts and miſſive weapons. Theſe chariots were made ſo ſtrong, that they laſted for ſeveral generations. Beſides this ſort, we find frequent mention of the *carus falcati*, or thoſe chariots armed with hooks, or ſcythes, with which whole ranks of ſoldiers were cut off together, if they had not the art of avoiding the danger. Theſe were not only uſed by the Perſians, Syrians, Egyptians, *&c.* but among the ancient Britons. Notwithſtanding the imperfect ſtate of ſome of the moſt neceſſary arts among that nation before the invaſion of the Romans, it is certain that they had war chariots in great abundance. By the Greek and Roman hiſtorians, theſe chariots are deſcribed by the ſix following names, *viz.* *Benna*, *Petoritum*, *Currus* or *Carrus*, *Covinus*, *Eſſedum*, and *Rheda*. The *benna* ſeems to have been a chariot deſigned rather for travelling than war. It contained two perſons, who were called COMBENNONES, from their ſitting together in the ſame machine. The PETORITUM ſeems to have been a larger kind, and is thought to have derived its name from the Britiſh word *pedwar*, ſignifying *four*, as it had 4 wheels. The *carrus* or CURRUS was the common cart or waggon. This kind of chariot was uſed by the ancient Britons, in times of peace, for the purpoſe of agriculture and merchandiſe; and, in time of war, for carrying their baggage, and wives and children, who commonly followed the armies of all the Celtic nations. The COVINUS was a war chariot, and a very terrible inſtrument of deſtruction; being armed with ſharp ſcythes and hooks for cutting and tearing all who came within its reach. This kind was made very ſlight, and had few or no men in it beſides the charioteer; being deſigned to drive with great force and rapidity, and to do execution chiefly with its hooks and ſcythes. The ESSEDUM and RHEDA were alſo war chariots, probably of a large ſize, and ſtronger made than the covinus, deſigned for containing a charioteer, and one or two warriors. The greateſt number of the Britiſh war chariots ſeem to have been of this kind. Cæſar relates that Caſſibelan, after diſmiſſing all his other forces, retained no fewer than 4000 of theſe war chariots; and that the Britons had arrived at ſuch perfection in the management of them, that "in the moſt ſteep and difficult places they could ſtop their horſes upon full ſtretch, turn them which way they pleaſed, run along the pole, reſt on the harneſs, and throw themſelves back into their chariots, with incredible dexterity."

(3.) CHARIOTS, in the heathen mythology, were ſometimes conſecrated to the ſun; and the ſcripture obſerves, that Joſiah burnt thoſe which had been offered to the ſun by his predeceſſors. This ſuperſtitious cuſtom was an imitation of the heathens, and principally of the Perſians, who had horſes and chariots conſecrated in honour of the ſun. Herodotus, Xenophon, and Quintus Curtius, ſpeak of white chariots crowned, among the Perſians, and drawn by white horſes; both conſecrated to the ſun.

(4.) CHARIOT, TRIUMPHAL, was one of the principal ornaments of the Roman celebration of a victory. It was generally made of ivory, round like a tower, or rather of a cylindrical figure; it was ſometimes gilt at the top, and ornamented with crowns; and to repreſent a victory more naturally, they uſed to ſtain it with blood. It was uſually drawn by 4 white horſes; but often by lions, elephants, tygers, bears, leopards, dogs, &c.

* *To* CHARIOT. *v. a.* [from the noun.] To convey in a chariot. This word is rarely uſed.—

An angel all in flames aſcended
As in a fiery column *charioting*
His godlike preſence. *Milton.*

* CHARIOTEER. *n. ſ.* [from *chariot.*] He that drives the chariot. It is uſed only in ſpeaking of military chariots, and thoſe in the ancient publick games.—

Show us the youthful handſome *charioteer*,
Firm in his ſeat, and running his career. *Prior.*

* CHARIOT RACE. *n. ſ.* [from *chariot* and *race.*] A ſport anciently uſed, where chariots were driven for the prize, as now horſes run.—There is a wonderful vigour and ſpirit in the deſcription of the horſe and *chariot race. Addiſon.*

CHARISIA, in antiquity, a wake, or night feſtival, inſtituted in honour of the Graces. It continued the whole night, moſt of which time was ſpent in dancing; after which, cakes made of yellow flour mixed with honey, and other ſweetmeats, were diſtributed among the aſſiſtants.—Chariſia is alſo ſometimes uſed to ſignify the ſweetmeats uſed on ſuch occaſions.

CHARISIUS, in the heathen theology, a ſurname of Jupiter; derived from χαρις, favour, as by his influence men obtain the favour of one another. The Greeks at their meals made a libation of a cup to Jupiter Chariſius.

CHARISTIA, a feſtival of the ancient Romans, celebrated in February, wherein the relations by blood and marriage met, in order to preſerve a good correſpondence; and that if there happened to be any difference among them, it might be the more eaſily accommodated, by the good humour and mirth of the entertainment. *Ovid. Faſt.* i. 617.

CHARISTICARY, commendatory, or donatory, a perſon to whom is given the employment of the revenues of a monaſtery, hoſpital, or benefice. The chariſticaries among the Greeks, enjoyed all the revenues of hoſpitals and monaſteries, without giving any account thereof. This abuſe ſprung from the ICONOCLASTÆ, particularly Conſtantine Copronymus, the avowed enemy of the monks, whoſe monaſteries he gave away to ſtrangers. In after times, the emperors and patriarchs gave many to people of quality, not by way of gift, to reap any temporal advantage from them; but to repair, beautify, and patronize them. At length avarice crept in, and thoſe in good condition were given away, eſpecially ſuch as were rich; and at laſt they were all given away.

CHARISTOLOCHIA, in botany, mugwort. See ARTEMISIA, § III.

* CHARITABLE. *adj.* [*charitable*, Fr. from *charité.*] 1. Kind in giving alms; liberal to the poor.—He that hinders a *charitable* perſon from giving alms to a poor man, is tied to reſtitution, if he hindered him by fraud or violence. *Taylor.* 2. Kind in judging of others; diſpoſed to tenderneſs; benevolent.—How had you been my friends elſe? Why have you that *charitable* title from thouſands, did you not chiefly belong to my heart! *Shak.*

* CHARITABLY. *adv.* [from *charity.*] 1. Kindly; liberally; with inclination to help the poor. 2. Benevolently; without malignity.—Nothing will more enable us to bear our croſs patiently, injuries *charitably*, and the labour of religion comfortably. *Taylor.*—

'Tis beſt ſometimes your cenſure to reſtrain,
And *charitably*, let the dull be vain. *Pope.*

CHARITATIVE AID, in the canon law, is a moderate allowance, which a council grants a biſhop upon any urgent occaſion; *e. g.* when his revenues will not bear his expences to a council, &c.

CHARITE, a town of France, in the department of Nievre, and ci-devant province of Nivernois. It ſtands in a kind of iſland, between a hill and the Loire, over which is a ſtone bridge. Its ſituation on the road from Paris to Lyons, and the canal of Briare, has made its trade very briſk. It has a woollen manufacture, and very extenſive ſteel and iron works, where all kinds of arms and hard wares are made. Its moſt remarkable edifice is the priory of the ci-devant Benedictine

Cluniſtes, which, while it monopoliſed many privileges, and ſwallowed up vaſt riches, was once of no ſmall public utility; as in a ſeaſon of great ſcarcity, the whole inhabitants of the town were maintained by it; whence it got its name *La Charité*. The prior was a temporal lord. It is 15 miles N. of Nevers.

CHARITES, in the heathen mythology, the three GRACES; the daughters of Jupiter and Eurynome. Their names were Aglaia, Thalia, and Euphroſyne. They were the conſtant attendants on Venus, and were repreſented as three young, beautiful, and modeſt virgins, all holding one another by the hand. They preſided over kindneſs and all good offices, and their worſhip was the ſame as that of the nine Muſes, with whom they had a temple in common. They were generally repreſented naked, becauſe kindneſſes ought to be done with ſincerity and candour. The moderns explain the allegory of their holding their hands joined, by obſerving, that there ought to be a perpetual and never ceaſing intercourſe of kindneſs and benevolence among friends. Their youth denotes the conſtant remembrance that we ought ought to have of kindneſſes received; and their virgin purity and innocence teaches us, that acts of benevolence ought to be done without any expectations of reſtoration, that we ought never to ſuffer others or ourſelves to be guilty of baſe or impure favours.

(1.) * CHARITY. *n. ſ.* [*charité*, Fr. *charitas*, Lat.] 1. Tenderneſs; kindneſs; love.—

By thee,
Founded in reaſon, loyal, juſt, and pure,
Relations dear, and all the *charities*
Of father, ſon, and brother, firſt were known.
Milton.

2. Goodwill; benevolence; diſpoſition to think well of others.—My errours, I hope, are only thoſe of charity to mankind, and ſuch as my own *charity* has cauſed me to commit, that of others may more eaſily excuſe. *Dryden.* 3. The theological virtue of univerſal love.—Concerning *charity*, the final object whereof is that incomprehenſible beauty which ſhineth in the countenance of Chriſt the Son of the living God. *Hooker.*—*Charity*, or a love of God, which works by a love of our neighbour, is greater than faith or hope. *Atterbury.* 4. Liberality to the poor.—The heathen poet, in commending the *charity* of Dido to the Trojans, ſpoke like a Chriſtian. *Dryden.* 5. Alms; relief given to the poor.—We muſt incline to the king: I will look for him, and privily relieve him; go you and maintain talk with the duke, that my *charity* be not of him perceived. *Shak.*

(2.) CHARITY, among divines, one of the three grand theological virtues, conſiſting in the love of God and of our neighbour, or the habit of diſpoſition of loving God with all our heart, and our neighbour as ourſelves. Charity, or love to God, is a divine principle implanted in the mind by the Holy Spirit, whereby we reverence, eſteem, deſire, and delight in him as the chief good. "Love to God is a ſubject, (ſays biſhop Porteous,) which concerns us to inquire into the true nature of. And it concerns us the more, becauſe it has been unhappily brought into diſrepute by the extravagant conceits of a few devout enthuſiaſts concerning it. Of theſe ſome have treated the love of God in ſo refined a way, and carried it to ſuch heights of ſeraphic ecſtacy and rapture, that common minds muſt for ever deſpair either of following or underſtanding them; whilſt others have deſcribed it in ſuch warm and indelicate terms as are much better ſuited to the groſſneſs of earthly paſſion than the purity of ſpiritual affection. But the accidental exceſſes of this holy ſentiment can be no juſt argument againſt its general excellence and utility. We know that even friendſhip itſelf has ſometimes been abuſed to the moſt unworthy purpoſes, and led men to the commiſſion of the moſt atrocious crimes. Shall we, therefore, utterly diſcard that generous paſſion, and conſider it as nothing more than unnatural fervour of a romantic imagination? Every heart revolts againſt ſo wild a thought; and why, then, muſt we ſuffer the love of God to be baniſhed out of the world becauſe it has been ſometimes improperly repreſented or indiſcreetly exerciſed? It is not either from the viſionary myſtic, the ſenſual fanatic, or the frantic zealot, but from the plain word of God, that we are to take our ideas of this divine ſentiment. There we find it deſcribed in all its native purity and ſimplicity. The marks by which it is there diſtinguiſhed contain nothing enthuſiaſtic or extravagant." If our ideas of charity are drawn from this ſource, then will its effects be genuine.

(3.) CHARITY is alſo uſed for the effect of a moral virtue, which conſiſts in ſupplying the neceſſities of others, whether with money, counſel, aſſiſtance, or the like.

(4.) CHARITY, ARGUMENTS IN FAVOUR OF. As pecuniary relief is generally the moſt efficacious, and at the ſame time that from which we are moſt apt to excuſe ourſelves, this branch of the duty merits particular illuſtration; and a better cannot be offered than what is contained in the following extracts from the elegant *Moral Syſtem* of Archdeacon *Paley*. "Whether pity be an inſtinct or a habit, it is in fact a property of our nature, which God appointed: and the final cauſe for which it was appointed, is to afford to the miſerable, in the compaſſion of their fellow creatures, a remedy for thoſe inequalities and diſtreſſes which God foreſaw that many muſt be expoſed to, under every general rule for the diſtribution of property. The Chriſtian ſcriptures are more copious and explicit upon this duty than any other. The deſcription which Chriſt hath left us of the proceedings of the laſt day, eſtabliſhes the obligation of bounty beyond controverſy. See *Matth.* xxv. 31—40. Suppoſing it only a ſcenical deſcription of the rules and principles by which the Supreme Arbiter of our deſtiny will regulate his deciſions, it conveys the ſame leſſon to us; it equally demonſtrates of how great value and importance theſe duties in the ſight of God are, and what ſtreſs will be laid upon them. The apoſtles alſo deſcribe this virtue as propitiating the divine favour in an eminent degree. And theſe recommendations have produced their effect. It does not appear that, before the times of Chriſtianity, an infirmary, hoſpital, or public charity of any kind exiſted in the world; whereas moſt countries in Chriſtendom have long abounded with theſe inſtitutions. To which may be added, that a ſpirit of private liberality ſeems to flouriſh amidſt the decay of many other virtues: not to mention the legal proviſion for the poor, which obtains in this country, and which was unknown and unthought of by the moſt poliſhed nations of antiquity.”

(5.) CHARITY, BROTHERS OF. See BILLETINS.

(6.) CHARITY, DIRECTIONS RESPECTING. St Paul gives upon this ſubject an excellent direction; and which is practicable by all who have any thing to give. “Upon the firſt day of the week, let every one of you lay by in ſtore, as God hath proſpered him.” By which the apoſtle may be underſtood to recommend what is the very thing wanting with moſt men, *the being charitable upon a plan;* that is, from a deliberate compariſon of our fortunes with the reaſonable expences and expectation of our families, to compute what we can ſpare, and to lay by ſo much for charitable purpoſes, in ſome mode or other. There are 3 kinds of charity, Mr Paley obſerves, which prefer a claim to attention. I. The firſt, and apparently one of the beſt, is to give ſtated and conſiderable ſums, by way of penſion or annuity to individuals or families, with whoſe behaviour and diſtreſs we ourſelves are acquainted. In ſpeaking of conſiderable ſums, it is meant only, that five pounds, or any other ſum, given at once, or divided amongſt five or fewer families, will do more good than the ſame ſum diſtributed amongſt a greater number in ſhillings or half crowns; and that, becauſe it is more likely to be properly applied by the perſons who received it. A poor fellow, who can find no better uſe for a ſhilling than to drink his benefactor's health, and purchaſe half an hour's recreation for himſelf, would hardly break into a guinea for any ſuch purpoſe, or be ſo improvident as not to lay it by for an occaſion of importance, for his rent, his clothing, fuel, or ſtock of winter's proviſion. It is a ſtill greater recommendation of this kind of charity, that penſions and annuities, which are paid regularly, and can be expected at the time, are the only way by which we can prevent one part of a poor man's ſufferings, the dread of want. II. But as this kind of charity ſuppoſes that proper objects of ſuch expenſive benefactions fall within our private knowledge and obſervation, which does not happen to all, a ſecond method of doing good, which is in every one's power who has money to ſpare, is by ſubſcription to public charities. Public charities admit of this argument in their favour, that your money goes farther towards attaining the end for which it is given, than it can do by any private and ſeparate beneficence. A guinea, for example, contributed to an infirmary, becomes the means of providing one patient, at leaſt, with a phyſician, ſurgeon, apothecary; with medicine, diet, lodging, and ſuitable attendance; which is not the tenth part of what the ſame aſſiſtance, if it could be procured at all, would coſt to a ſick perſon or family in any other ſituation. III. The laſt, and, compared with the former, the loweſt exertion of benevolence, is in the relief of beggars. The indiſcriminate rejection of all who implore our alms in this way, is by no means approved. Some may periſh by ſuch a conduct. Men are ſometimes overtaken by diſtreſs, for which all other relief would come too late. Beſides which, reſolutions of this kind compel us to offer ſuch violence to our humanity, as may go near, in a little while, to ſuffocate the principle itſelf; which is a very ſerious conſideration. A good man, if he do not ſurrender himſelf to his feelings without reſerve, will at leaſt lend an ear to importunities which come accompanied with outward atteſtations of diſtreſs; and, after a patient hearing of the complaint, will direct himſelf by the circumſtances and credibility of the account that he receives. There are other ſpecies of charity well contrived to make the money expended *go far;* ſuch as keeping down the price of fuel or proviſion in caſe of monopoly or temporary ſcarcity, by purchaſing the articles at the beſt market, and retailing them at prime coſt, or at a ſmall loſs; or the adding a bounty to a particular ſpecies of labour, when the price is accidentally depreſſed. The proprietors of large eſtates have it in their power to facilitate the maintenance, and thereby encourage the eſtabliſhment of families (which is one of the nobleſt purpoſes to which the rich and great can convert their endeavours,) by building cottages, ſplitting farms, erecting manufactures, cultivating waſtes, embanking the ſea, draining marſhes, and other expedients, which the ſituation of each eſtate points out. If the profit of theſe undertakings do not repay the expence, let the authors of them place the difference to the account of charity. It is true, of almoſt all ſuch projects, that the public is a gainer by them, whatever the owner be. And where the loſs can be ſpared, this conſideration is ſufficient.

(7.) CHARITY, DOUBT RESPECTING THE GIVING OF. It is become a queſtion of ſome importance, Under what circumſtances works of charity ought to be done in private, and when they may be made public without detracting from the merit of the action; if indeed they ever may, the Author of our religion having delivered a rule upon this ſubject, which ſeems to enjoin univerſal ſecrecy. See *Matth.* vi. 3, 4. From the preamble to this prohibition, (verſe 2.) it is plain, that our Saviour's ſole deſign was to forbid *oſtentation* and all publiſhing of good works which proceeds from that motive: “Take heed that ye do not your alms before men, *to be ſeen of them,*” &c. There are motives for the doing our alms in public beſides thoſe of oſtentation; with which therefore our Saviour's rule has no concern: ſuch as to teſtify our approbation of ſome particular ſpecies of charity, and to recommend it to others; to take off the prejudice which the want, or, which is the ſame thing, the ſuppreſſion, of our name in the liſt of contributors, might exite againſt the charity or againſt ourſelves. And, ſo long as theſe motives are free from any mixture of vanity, they are in no danger of invading our Saviour's prohibition: they rather ſeem to comply with another direction which he has left us: “Let your light ſo ſhine before men, that they ſeeing your good works, may glorify your father which is in heaven." If it be neceſſary to propoſe a preciſe diſtinction upon the ſubject, there can be none better than the following: When our bounty is beyond our fortune or ſtation, that is, when it is more than could be expected from us, our charity ſhould be private, if privacy be practicable when it is not more than might be expected, it may be public; for we cannot hope to influence others to the imitation, of extraordinary generoſity, and therefore want in the former caſe, the only juſtifiable reaſon for making it public.

(8.) CHARITY, EXCUSES FOR NOT BESTOWING. The pretences by which men excuſe themſelves from giving to the poor, are various; as, 1. "That they have nothing to ſpare;" i. e. nothing, for which they have not ſome other uſe; nothing, which their plan of expence, together with the ſaving, they have reſolved to lay by, will not exhauſt: never reflecting whether it be in their power, or that it is their duty to retrench their expences, and contract their plan, "that they may have to give to them that need;" or rather that this ought to have been part of their plan originally. 2. "That they have families of their own, and that charity begins at home." A father is no doubt bound to adjuſt his œconomy with a view to the reaſonable demands of his family upon his fortune; and until a ſufficiency for theſe is acquired, or in due time probably will be acquired, (for in human affairs probabilty is enough,) he is juſtified in declining expenſive liberality: for to take from thoſe who want, in order to give to thoſe who want, adds nothing to the ſtock of public happineſs. Thus far, therefore and no farther the plea in queſtion is an excuſe for parſimony, and an anſwer to thoſe who ſolicit our bounty. 3. "That charity does not conſiſt in giving money, but in benevolence, philanthropy, love to all mankind, goodneſs heart," &c. Hear St James: (ii. 1, 16.) "If a brother or ſiſter be naked, and deſtitute of daily food, and one of you ſay unto them depart in peace, be ye warmed and filled, notwithſtanding *ye give them not thoſe things which are needful to the body*, what doth it profit?" 4. "That giving to the poor is not mentioned in St Paul's deſcription of charity, in the 13th chapter of his firſt epiſtle to the Corinthians." This is not a deſcription of charity, but of good nature and it is not neceſſary that every duty be mentioned in every place. 5. "That they pay the poors rates." They might as well allege that they pay their debts; for the poor have the ſame right to that portion of a man's property, which the laws aſſign them, that the man himſelf has to the remainder. 6. "That they employ many poor perſons:"—for their own ſake, not the poor's—otherwiſe it is a good plea. 7. "That the poor do not ſuffer ſo much as we imagine; that education and habit have reconciled them to the evils of their condition, and make them eaſy under it." Habit can never reconcile human nature to the extremities of cold, hunger, and thirſt, any more than it can reconcile the hand to the touch of a red-hot iron: beſides, the queſtion is not, how unhappy any one is, but how much more happy it is in our power to make him. 8. "That theſe people, give them what you will, will never thank you, or think of you for it." In the firſt place, this is not true: in the ſecond place, it was not for the ſake of their thanks that you relieved them. 9. "That we are ſo liable to be impoſed upon." If a due enquiry be made, our motive and merit is the ſame: beſide that the diſtreſs is generally real, whatever has been the cauſe of it. 10. "That they ſhould apply to their pariſhes." This is not always practicable: to which we may add, that there are many requiſities to a comfortable ſubſiſtence, which pariſh relief does not always ſupply; and that there are ſome who would ſuffer almoſt as much from receiving pariſh relief as by the want of it: and laſtly, that there are many modes of charity, to which this anſwer does not relate at all. 11. "That giving money encourages idleneſs and vagrancy." This is true only of injudicious and indiſcriminate generoſity. 12. "That we have too many objects of charity at home to beſtow any thing upon ſtrangers; or that there are other charities which are more uſeful, or ſtand in greater need." The ſtrength of this excuſe depends entirely upon the *fact*, whether we actually relieve thoſe neighbouring objects, and contribute to thoſe other charities. Beſides all theſe excuſes, pride, or prudery, or delicacy, or love of eaſe, keep one half of the world out of the way of obſerving what the other half ſuffer.

(9.) CHARITY, FEASTS OF. See AGAPE.

(10.) CHARITY OF OUR LADY, in church hiſtory, a ci-devant religious order in France eſtabliſhed in the 13th century, which though charity was the principal motive of their union, became ſo diſorderly and irregular, that their order dwindled, and at laſt became extinct.

(11.) CHARITY OF ST HIPPOLITUS, a religious congregation founded about the end of the 14th century, by one Bernardin Alvarez, a Mexican, in honour of St Hippolitus the martyr, patron of Mexico; and approved by Pope Gregory XIII.

(12.) CHARITY, ORDER OF. There are ſeveral religious orders which bear this title: particularly one inſtituted by St John de Dieu, for the aſſiſtance of the ſick; approved of in 1520, by Leo X. and confirmed by Paul V. in 1617. They apply themſelves wholly to the ſervice of the diſeaſed.

(13.) CHARITY SCHOOLS, are ſchools erected and maintained in various pariſhes by the voluntary contributions of the inhabitants, for teaching poor children to read, write, and other neceſſary parts of education. See SCHOOL.

* *To* CHARK. *v. n.* To burn to a black cinder, as wood is burned to make charcoal.—Exceſs, either with an apoplexy, knocks a man on the head, or, with a fever, like a fire in a ſtrong water ſhop, burns him down to the ground; or if it flames not out, *charks* him to a coal. *Grew's Coſmologia Sacra.*

* CHARLATAN. *n. ſ.* [*charlatan*, Fr. *ciarlatano*, Ital. [from *ciarlare*, to chatter.] A quack; a mountebank; an empirick.—Saltimbanchoes, quackſalvars, and *charlatans*, deceive them in lower degrees. *Brown's Vulgar Errours.*—

For *charlatans* can do no good,
Until they're mounted in a crowd. *Hudibras.*

* CHARLATANICAL. *adj.* [from *charlatan.*] Quackiſh; ignorant.—A cowardly ſoldier, and a *charlatanical* doctor, are the principal ſubjects of comedy. *Cowley.*

* CHARLATANRY. *n. ſ.* [from *charlatan.*] Wheedling; deceit; cheating with fair words.

CHARLCOMB, a village near Bath.

CHARLCOT, the name of three villages: 1. in Hampſhire, near Whit-church: 2. in Shropſhire, E. of Brown Clee hill: and, 3. in Warwickſhire, NE. of Stratford.

CHARLEMAGNE, a name given by hiſtorians to CHARLES I. king of France, being a contraction of *Charles le Magne*, i. e. Charles the Great. Upon the death of his father Pepin and his brother Carloman, he ſucceeded as ſole king of the Franks, A. D. 768-9; and became emperor of the weſt by conqueſt in 800, which laid the foundation of the dynaſty of the weſtern Franks, who ruled the empire 472 years. Charlemagne was as illuſtrious in the cabinet as in the field; and, though he could not write his name, was the patron of men of letters, the reſtorer of learning, and a wiſe legiſlator: But when we read of his beheading 4500 Saxons, ſolely for their loyalty to their prince in oppoſing his conqueſts, we cannot think he merits the extravagant encomiums beſtowed on him by ſome hiſtorians. He died in 814, in the 74th year of his age, and 47th of his reign. See FRANCE, HISTORY OF.

(1.) CHARLEMONT, a town of France in the new department of Sambre and Meuſe, and ci-devant Province of Namur in the late Auſtrian Netherlands, about 25 miles SW. of Namur. Lon. 4. 40. E. Lat. 50. 6. N.

(2.) CHARLEMONT, a town of Ireland, ſituated, on the Blackwater, in the county of Armagh, about 6 miles SE. of Dungannon, and 68 NW. of Dublin. Lon. 6. 50. W. Lat. 50. 16. N.

CHARLEROY, a ſtrong town of France, in the department of Sambre and Meuſe, and ci-devant province of Namur, in the late Auſtrian Netherlands; ſituated on the river Sambre, 18 miles W. of Namur. Lon. 4. 20. E. Lat. 50. 30. N.

(1-29.) CHARLES, a name common to 29 European monarchs; viz. 6 emperors of Germany, 9 kings of France, 2 of Great Britain, and 12 of Sweden. The hiſtory of the reigns of moſt of theſe ſovereigns will be found under that of their reſpective dominions. [See ENGLAND, FRANCE, GERMANY, and SWRDEN. But the lives and characters of two of them abound with peculiarities ſo ſtriking, and ſo much more proper for biography than hiſtory, that we muſt here allot two diſtinct biographical articles to them.

CHARLES V. emperor and king of Spain, was ſon of Philip I. archduke of Auſtria, and of Jane queen of Caſtile. He was born at Ghent, Feb. 24. 1500, and ſurceeded to the crown of Spain, in 1517. Two years afterwards, he was choſen emperor at Francfort, on the death of Maximilian his grandfather. He was a great warrior and politician: and his ambition was not ſatisfied with the many kingdoms and provinces he poſſeſſed; for he aſpired at univerſal empire. He is ſaid to have fought 60 battles, in moſt of which he was victorious. He took the king of France, Francis I. priſoner, and ſold him his liberty on very hard terms: yet afterwards, when the people of Ghent revolted, he aſked leave to paſs through his dominions; and though the generous king thus had him in his power, and had an opportunity of revenging his ill treatment, yet he received and attended him with all pomp and magnificence. He ſacked Rome, and took the Pope priſoner; and the cruelties which his army exerciſed there are ſaid to have exceeded thoſe of the northern barbarians. Yet the pious emperor went into mourning on account of this conqueſt: forbad the ringing of bells; commanded proceſſions to be made, and prayers to be offered up for the deliverance of the Pope his priſoner; yet did not inflict the leaſt puniſhment on thoſe who treated the holy father and the holy ſee with ſuch inhumanity. He is accuſed by ſome Romiſh writers of favouring the Lutheran principles, which he might eaſily have extirpated. But the truth is, he found his account in the diviſions which that ſect occaſioned; and he took his advantage of them, ſometimes againſt the Pope, ſometimes againſt France, and at other times againſt the empire itſelf. He was a great traveller, and made 50 different journeys into Germany, Spain, Italy, Flanders, France, England, and Africa. Though he had been ſucceſsful in many unjuſt enterprizes, yet his laſt attempt on Metz, which he beſieged with an army of 100,000 men, was very juſt and very unſucceſsful. Vexed at the reverſe of fortune which ſeemed to attend his latter days, and oppreſſed by ſickneſs, which unfitted him any longer from holding the reins of government with ſteadineſs, or to guide them with addreſs, he reſigned his dominions to his brother Ferdinand and his ſon Phillip; and retreated to the monaſtery of St Juſtus near Placentia in Eſtremadura. When Charles entered this retreat, he formed ſuch a plan of life, as would have ſuited a private gentleman of moderate fortune. His table was neat, but plain; his domeſtics few; his intercourſe with them familiar; all ceremonious forms were entirely aboliſhed, as deſtructive of that ſocial eaſe which he courted, to ſooth the remainder of his days. As the mildneſs of the climate, with his deliverance from the cares of government, procured him a conſiderable remiſſion from the acute pains of the gout, he enjoyed more ſatisfaction in this humble retirement, than all his grandeur had ever yielded him. The ambitious projects which had ſo long diſquieted him, were quite effaced. Far from taking any part in the political tranſactions of Europe, he reſtrained his curioſity even from an enquiry concerning them. Other amuſements now occupied him. Sometimes he cultivated the plants in his garden; ſometimes he rode out to the neighbouring wood, attended by a ſingle ſervant. When his infirmities confined him to his apartment, he either admitted a few gentlemen to viſit him, and entertained them familiarly at his table; or employed himſelf in ſtudying mechanics, and forming curious works of mechaniſm, to which his genius was peculiarly turned. With this view he had engaged Turriano, an ingenious artiſt, to accompany him in his retreat. He laboured with him in making models of the moſt uſeful machines, as well as in making experiments with regard to their powers; and the monarch often aſſiſted or perfected the inventions of the artiſt. He relieved his mind at intervals with faſhioning puppets, which, by internal ſprings, mimicked the actions of men, to the aſtoniſhment of the monks, who, beholding movements which they could not comprehend, ſuſpected Charles and Turriano of being in compact with inviſible powers. He was particularly curious with regard to clocks and watches; and having found that he could not bring any two of them to go *exactly alike*, he reflected with regret on his own folly, in having beſtowed ſo much time and labour in the more vain attempt, of bringing mankind to a *uniformity* of ſentiment, concerning the myſterious doctrines of religion. In the midſt of theſe amuſements, Charles conſtantly employed a conſiderable portion of his time in religious exerciſes. He took pleaſure in reading books of devotion, and converſed much with his confeſſor, and the prior on pious ſubjects. Thus did Charles paſs the firſt year of his retreat, either in innocent amuſements which ſoothed his pains, or in devout occupations, which he deemed neceſſary in preparing for another ſtate. But, about 6 months before his death, the gout returned with increaſed violence. His ſhattered conſtitution had not ſtrength to withſtand ſuch a ſhock. It enfeebled his mind as much as his body; and from this period hardly left any traces of that ſound underſtanding which diſtinguiſhed Charles among his cotemporaries. An illiberal and timid ſuperſtition depreſſed his ſpirit. He loſt all reliſh for amuſements of any kind. He endeavoured to conform, in his manner of living, to all the rigour of monaſtic auſterity. He deſired no other ſociety than that of monks, and was almoſt continually employed in chanting with them the hymns of the miſſal. As an expiation for his ſins, he gave himſelf the diſcipline in ſecret with ſuch ſeverity, that the whip which he employed, was found after his deceaſe, tinged with his blood. Nor was he ſatiſfied with theſe acts of mortification. The timorous and diſtruſtful ſolicitude which always accompanies ſuperſtition, ſtill continued to diſquiet him, and prompted him to aim at ſomething extraordinary, ſome new and ſingular act of piety, that would diſplay his zeal, and merit the favour of heaven. The action which he fixed was as wild as any that ſuperſtition ever ſuggeſted to a diſordered fancy. He reſolved to celebrate his own obſequies before his death. He ordered his tomb to be erected in the chapel of the monaſtery. His domeſtics marched in funeral proceſſion, with black tapers in their hands. He himſelf followed in his ſhroud. He was laid in his coffin with much ſolemnity. The ſervice for the dead was chanted; and Charles joined in the prayers which were offered up for the reſt of his ſoul, mingling his tears with thoſe which his attendants ſhed, as if they had been celebrating a real funeral. The ceremony cloſed with ſprinkling holy water on the coffin in the uſual form, and, all the aſſiſtants retiring, the doors of the chapel were ſhut. Then Charles roſe out of the coffin, and withdrew to his apartment, full of thoſe awful ſentiments which ſuch a ſingular ſolemnity was calculated to inſpire. But either the fatiguing length of the ceremony, or the impreſſion which this image of death left on his mind, affected him ſo much, that next day he was ſeized with a fever. His feeble frame could not long reſiſt its violence; and he expired on the 21ſt Sept. after a life of 58 years 6 months and 21 days.

Charles XII. king of Sweden, was born in 1682. By his father's will, the adminiſtration was lodged in the hands of the queen-dowager Eleonora with five ſenators, till the young prince was 18: but he was declared major at 15, by the ſtates convened at Stockholm. The beginning of his adminiſtration raiſed no favourable ideas of him, as he was thought both by Swedes and foreigners to be a perſon of mean capacity. But the difficulties that gathered round him, ſoon afforded him an opportunity to diſplay his real character. Frederick V. king of Denmark, Auguſtus king of Poland and elector of Saxony, and Peter the Great czar of Muſcovy, preſuming on his youth, conſpired his ruin almoſt at the ſame inſtant. Their meaſures alarming the council, they were for diverting the ſtorm by negociations; but Charles, with a grave reſolution that aſtoniſhed them, ſaid, "I am reſolved never to enter upon an unjuſt war, nor to put an end to a juſt one, but by the deſtruction of my enemies. My reſolution is fixed; I will attack the firſt who ſhall declare againſt me; and when I have conquered him, I may hope to ſtrike a terror into the reſt." The old counſellors received his orders with admiration; and were ſtill more ſurpriſed, when they ſaw him on a ſudden renounce all the enjoyments of a court, reduce his table to the utmoſt frugality, dreſs like a common ſoldier, and, full of the ideas of Alexander and Cæſar, propoſe thoſe two conquerors for his models in every thing but their vices. The king of Denmark began by ravaging the territories of the duke of Holſtein. Upon this Charles carried the war into the heart of Denmark; and made ſuch a progreſs, that the king of Denmark thought it beſt to accept of peace, which was concluded in 1700. He next reſolved to advance againſt the king of Poland, who had blocked up Riga. He had no ſooner given orders for his troops to go into winter quarters, than he received advice that Narva, where count Horne was governor, was beſieged by an army of 100,000 Muſcovites. This made him alter his meaſures, and move towards the Czar; and at Narva he gained a ſurpriſing victory, which coſt him not above 2000 men killed and wounded. The Muſcovites were forced to retire from the provinces they had invaded. He purſued his conqueſts till he penetrated as far as where the diet of Poland was ſitting; when he made them declare the throne of Poland vacant, and elect Staniſlaus their king; then making himſelf maſter of Saxony, he obliged Auguſtus himſelf to renounce the crown of Poland, and acknowledge Staniſlaus by a letter of congratulation on his acceſſion. All Europe was ſurpriſed with the expeditious finiſhing of this great negociation, but more with the diſintereſtedneſs of the king of Sweden, who ſatisfied himſelf with the bare reputation of this victory, without demanding an inch of ground for enlarging his dominions. After thus reducing the king of Denmark to peace, placing a new king on the throne of Poland, having humbled the emperor of Germany, and protected the Lutheran religion, Charles prepared to penetrate into Muſcovy to dethrone the Czar. He quickly obliged the Muſcovites to abandon Poland, purſued them into their own country, and won ſeveral battles over them. The Czar, diſpoſed

ſed to peace, made ſome propoſals; Charles only anſwered, "I will treat with the Czar at Moſcow." When this haughty anſwer was brought to Peter, he ſaid, "My brother Charles ſtill affects to act the *Alexander*, but I flatter myſelf he will not find in me a *Darius*." The event juſtified him; for the Muſcovites, already beaten into diſcipline, and under a prince of ſuch talents as Peter, entirely deſtroyed the Swediſh army at the memorable battle of Pultowa, July 8, 1709; on which deciſive day, Charles loſt the fruits of 9 years labour, and of almoſt 100 battles! The king with a ſmall troop, purſued by the Muſcovites, paſſed the Boriſthenes to Oczakow in the Turkiſh territories: and from thence, through deſert countries, arrived at Bender; where the Sultan, when informed of his arrival, ſent orders for accommodating him in the beſt manner, and appointed him a guard. Near Bender, Charles built a houſe, and intrenched himſelf; and had with him 1800 men, who were all clothed and fed, with their horſes, at the expence of the Grand Signior. Here he formed a deſign of turning the Ottoman arms upon his enemies; and is ſaid to have had a promiſe from the vizir of being ſent into Muſcovy with 200,000 men. While he remained here, he inſenſibly acquired a taſte for books: he read the tragedies of Corneille and Racine, with the works of Deſpreaux, whoſe ſatires he reliſhed, but did not much admire his other works. When he read that paſſage in which the author repreſents Alexander as a fool and a madman, he tore out the leaf. He ſometimes played at cheſs; but when he recovered of his wounds, he renewed his fatigues in exerciſing his men; he tired three horſes a day; and thoſe who courted his favour were all day in their boots. To diſpoſe the Ottoman Porte to this war, he detached about 800 Poles and Coſſacks of his retinue, with orders to paſs the Neiſter, and to obſerve what paſſed on the frontiers of Poland. The Muſcovite troops, diſperſed in thoſe quarters, fell immediately upon this little company, and purſued them even to the territories of the Grand Signior. This was what Charles expected. His miniſters at the Porte excited the Turks to vengeance: but the Czar's money removed all difficulties, and Charles found himſelf in a manner priſoner among the Tartars. He imagined the Sultan was ignorant of the intrigues of his Grand Vizir. Poniatowſky undertook to make his complaints to the Grand Signior. The Sultan, in anſwer, ſome days after, ſent Charles five Arabian horſes, one of which was covered with a ſaddle and houſing of great riches; with an obliging letter, but conceived in ſuch general terms, as gave reaſon to ſuſpect that the miniſter had done nothing without the Sultan's conſent; Charles therefore refuſed them. Poniatowſky had the courage to form a deſign of depoſing the Grand Viſir; who accordingly was deprived of his dignity and wealth, and baniſhed. The ſeal of the empire was given to Numan Cuproughly; who perſuaded his maſter that the law forbid him to invade the Czar, who had done him no injury; but to ſuccour the king of Sweden as an unfortunate prince in his dominions. He accordingly ſent him 800 purſes, every one of which amounted to 500 crowns, and adviſed him to return peaceably to his own dominions. Charles rejected this advice, threatening to hang up the baſhaws, and ſhave the beards of any janiſaries who brought him ſuch meſſages; and ſent word, that he ſhould depend upon the Grand Signior's promiſe, and hoped to re-enter Poland as a conqueror with an army of Turks. After various intrigues at the Porte, an order was ſent to attack this *head of iron*, as he was called, and to take him either alive or dead. He ſtood a ſiege in his houſe, with 40 domeſtics, againſt the Turkiſh army; killed no leſs than 20 janiſaries with his own hand; and performed prodigies of valour on a very unneceſſary and unwarrantable occaſion. But the houſe being ſet on fire, and himſelf wounded, he was at laſt taken priſoner, and ſent to Adrianople; where the Grand Signior gave him audience, and promiſed to make good all the damages he had ſuſtained. At laſt, after a ſtay of above five years, he left Turkey; and having diſguiſed himſelf, traverſed Wallachia, Tranſylvania, Hungary, and Germany, attended only by one perſon: and in 16 days riding, during which time he never went to bed, came to Stralſund at midnight, Nov. 21, 1714. His boots were cut from his ſwollen legs, and he was put to bed; where, when he had ſlept ſome hours, the firſt thing he did was to review his troops, and examine the ſtate of the fortifications. He ſent out orders that very day, to renew the war with more vigour than ever. But affairs were now much changed: Auguſtus had recovered the throne of Poland; Sweden had loſt many of its provinces, and was without money, trade, credit, or troops. The kings of Denmark and Pruſſia ſeized the iſland of Rugen; and beſieged him in Stralſund, which ſurrendered; but Charles eſcaped to Carelſcroon. But while his country was threatened with invaſion by ſo many princes, he, to the ſurpriſe of all Europe, marched into Norway with 20,000 men. A very few Danes might have ſtopped the Swediſh army; but ſuch a quick invaſion they could not forſee. Europe was yet more at a loſs to find the Czar ſo quiet, and not making a deſcent upon Sweden, as he had before agreed with his allies. This inaction was the conſequence of one of the greateſt deſigns, and at the ſame time the moſt difficult, of any that were ever formed by the imagination of man. In ſhort, a ſcheme was ſet on foot for a reconciliation with the Czar; for replacing Staniſlaus on the throne of Poland; and ſetting James II's ſon upon that of Britain; beſides reſtoring the duke of Holſtein to his dominions. Charles, pleaſed with theſe grand ideas, though without building much upon them, gave his miniſter leave to act at large. In the mean time, Charles was going to to make a ſecond attempt upon Norway in 1718; and he flattered himſelf with being maſter of that kingdom in ſix months: but while he was examining the works at Fredericſhall, a place of great ſtrength, and which is reckoned the key of that kingdom, he was killed by a ſhot from the enemy, as has been generally believed; though it has been alſo reported, that he fell by the treachery of one of his own officers, who had been bribed for that purpoſe. Charles experienced the extremes of proſperity and of adverſity, without being ſoftened by the one, or diſturbed by the other; but he was a man rather extraordinary than great, and fitter to be admired than imitated. He was honoured by the Turks for his rigid abſtinence from wine, and his regularity in attending public devotion. As to his perſon, he was tall and of a noble mein, had a fine open forehead, large blue eyes, flaxen hair, fair complexion, handſome noſe, but little beard, and a laugh not agreeable. His manners were harſh and auſtere, not to ſay ſavage: and as to religion, he was indifferent towards all, though exteriorly a Lutheran, and a ſtrong believer in predeſtination. A few anecdotes will illuſtrate his character. No dangers, however great, made the leaſt impreſſion upon him. When a horſe or two were killed under him at the battle of Narva in 1700, he leaped nimbly upon freſh ones, ſaying, *Theſe people find me exerciſe.* One day, when he was dictating letters to a ſecretary, a bomb fell through the roof into the next room of the houſe where they were ſitting. The ſecretary, terrified leſt the houſe ſhould come down upon them, let his pen drop out of his hand: *What is the matter?* ſays the king calmly. The ſecretary could only reply, *Ah, Sir, the bomb.—The bomb!* ſays the king, *What has the bomb to do with what I am dictating to you? Go on.* He preſerved more humanity than is uſually found among conquerors. Once, in the middle of an action, finding a young Swediſh officer wounded and unable to march, he obliged the officer to take his horſe, and continued to command his infantry on foot. The princeſs Lubomirſki, who was very much in the intereſt and good graces of Auguſtus, falling by accident into the hands of one of his officers, he ordered her to be ſet at liberty, ſaying, he did not make war with *women.*" One day, near Leipſic, a peaſant threw himſelf at his feet, with a complaint againſt a grenadier, that he had robbed him of certain eatables provided for himſelf and family. "Is it true, ſaid Charles ſternly, that you have robbed this man? The ſoldier replied, "Sir, I have not done near ſo much harm to this man, as your Majeſty has done to his maſter; for you have taken from Auguſtus *a kingdom*, whereas I have only taken from this poor ſcoundrel *a dinner.*" Charles made the peaſant amends, and pardoned the ſoldier for his firmneſs: "However, my friend, (adds he) you will do well to recollect, that if I took a kingdom from Auguſtus, I did not take it for myſelf." Though Charles lived hardly himſelf, a ſoldier did not fear to remonſtrate to him againſt ſome bread, which was very black and mouldy, and which yet was the only proviſion the troops had. Charles called for a piece of it, and calmly eat it up, ſaying, "that it was indeed not good, but that it might be eaten." He wrote ſome obſervations on war, and on his own campaigns from 1700 to 1709; but the MS. was loſt at the unfortunate battle of Pultowa.

(II.) **Charles**, in geography, the name of a county, a river, and two promontories of N. America, viz.

i. **Charles**, a county of Maryland, in the Weſtern Shore, bounded on the S. and W. by the Potomac, which ſeparates it from Virginia; on the N. by Prince George's; on the E. by the Patuxent, and on the SE. by St Mary's. It is 27 miles long, and equally broad; and contained in 1795, 10,528 free inhabitants, and 10,085 ſlaves. The lands in general are low and ſandy; and produce tobacco, Indian corn, and potatoes. The chief town is Port Tobacco.

ii. **Charles**, a river of Maſſachuſett's, which flows from a pond bordering on Hopkinton, in Worceſter county. After running S. by E. for ſeveral miles, it turns to the NE. where it receives the ſmall river Stop; thence running N. for ſome miles, it winds NE. by E. to Mother Brook, a ſtream which flows from this river, and unites with the Neponſet. Thence winding from the NE. by E. nearly into a NW. direction about 7 miles, it turns to the NE. by N. as far as Watertown: whence meandring in an ESE. direction, it falls into Boſton harbour, between that city and Charleſtown. It is navigable in boats for 7 miles up to Watertown. In its courſe through Newton townſhip, it has ſeveral romantic and pictureſque waterfalls. Two bridges are erected over it. See **Charleston**, N° 3.

iii. **Charles, Cape**, a promontory of Virginia, on the N. ſide of Cheſapeak Bay. Lon. 75. 30. W. Lat. 37. 12. N.

iv. **Charles, Cape**, a promontory on the SW. part of the Strait, entering Hudſon's Bay. Lon. 75. 15. W. Lat. 62. 10. N.

(III.) **Charles Martel**, a celebrated French conqueror, the father of Pepin, and grandfather of Charlemagne, kings of France. He depoſed and reſtored Chilperic king of France; and had the entire government of the kingdom, once with the title of *mayor of the palace*, and afterwards as *duke of France;* but he would not accept of the crown. He died, regretted, in 741. He got the ſurname of *Martel*, or *the Hammer*, from the heavy blows he dealt around him in a battle againſt the Saracens.

Charles-city, a county in Virginia, 30 miles long, and 9 broad. It is bounded on the N. and E. by the Chickahominy, which ſeparates it from the counties of New Kent and James-city; on the S. and W. by James river, and on the NW. by Henrico. It contains 2,447 free inhabitants, and 3141 ſlaves. A county court is held at the court houſe the 3d Thurſday of every month.

Charles-fort, a fortreſs of Ireland, in the county of Cork, ſituated at the entrance of Kinſale harbour. Lon. 8. 40. W. Lat. 51. 21. N.

* **Charles's-wain.** *n.ſ.* The northern conſtellation, called the Bear.—There are ſeven ſtars in Urſa minor, and in *Charles's wain*, or Plauſtrum of Urſa major, ſeven. *Brown's Vulgar Errours.*

(1.) **CHARLESTON**, a diſtrict of the United States, in S. Carolina, bounded on the NE. by that of George-town; on the NW. by Orangeburg; on the SW. by Beaufort, and on the SE. by the ocean. Its form is oblong, being about 60 miles long and 55 broad. It is watered by the rivers Wando, Cooper, Aſhley, Ponpon, Aſhepoo, and Cambahee. The ſoil near the rivers and on the coaſt is rich and well cultivated, producing large crops of Indian corn, rice, indigo, &c. In 1795, it contained 28,351 free inhabitants, and 48,634 ſlaves.

(2.) **Charleston**, a handſome city in the above diſtrict, and the capital of the State, ſituated on the peninſula formed by the Aſhley and the

Cooper, which unite on the E. ſide of it; fall into the ocean 6 miles E. by S. of it, and are navigable for 20 miles above it. This city is built on a regular plan, conſiſting of ſeveral parallel ſtreets, which extend E. and W. from river to river, and are croſſed by others at right angles. Their breadth is from 35 to 66 feet and they are furniſhed with piazzas. The houſes are moſtly of brick and ſome of them very elegant. The public buildings are, a ſtate houſe, an exchange, an armoury, a college, ſeveral academies, an orphan houſe, a poors-houſe, a Jewiſh ſynagogue, and 11 other places of worſhip; viz. 2 for Epiſcopalians, 2 for Independents, and one each for Scots Preſbyterians, Baptiſts, Methodiſts, Quakers, German Lutherans, French Proteſtants, and Roman Catholics. The ſituation is healthy; and the neighbourhood beautiful beyond deſcription. The harbour is good in every reſpect, but that of a bar, which hinders veſſels of more than 200 tons burden, loaded, from entering. The fortifications, which were ſtrong, are now demoliſhed. Charleſton carries on an extenſive trade to Europe and the W. Indies; being the 4th commercial town in the Union. The exports in 1794 amounted to 3,846,392 dollars; and the number of veſſels belonging to this port was 735 in 1787; but it is now eſtimated at about 1000. By the cenſus of 1790, it contained 16,400 inhabitants, of whom 7,700 were ſlaves. It was incorporated in 1783, and divided into 13 wards, each of which chooſes a warden; and from theſe the citizens elect an intendant. The intendant and wardens form the city council. A federal circuit court is held in it on the 25th Oct. and a diſtrict court quarterly on Monday. Charleſton has often ſuffered from fire; the laſt and moſt deſtructive happened in June 1796. This city lies 119 miles NE. of Savannah; 376 from Edinton; 540 from Richmond; 644 from Baltimore, and 746 SW. by S. of Philadelphia. Lon. 79. 30. W. Lat. 32. 50. N.

(3.) **Charleston**, a handſome flouriſhing town of Maſſachuſſetts, and the largeſt in Middleſex county. It is ſeated on a peninſula formed by the river Myſtic on the N. and a bay of Charles river on the SW. It is ſeparated from Boſton by the Charles, over which a bridge was erected in 1787; ſupported by 75 wooden piers, with a draw bridge in the middle for the paſſage of veſſels. It is 1,503 feet long, and 43 broad; and has a path 6 feet wide on each ſide, railed in for foot paſſengers. At low water the floor of this bridge is 17 feet above the river, but at full tide only 4. It is illuminated with 40 lamps. Charleſton is connected with Malden by another bridge, erected in 1788, which is 2,420 feet long, 32 broad, and has a draw, 30 feet wide; the water being about 23 feet deep at full tide. This town was burnt in 1775, by Gen. Gage; (See America, § 14.) when houſes and property were deſtroyed to the amount of L.136,900. It contained, in 1795, about 2000 inhabitants. They manufacture pot and pearl aſhes, rum, braſs, pewter, ſhips, leather, &c. Lon. 70. 33. W. Lat. 42. 25. N.

(4.) **Charleston**, a poſt town of Maryland, on the Eaſtern Shore, in Cecil county, W. of the river North Eaſt, 4 miles from the head of Cheſapeak Bay. It is chiefly inhabited by perſons engaged in the herring fiſhery. It is 10 miles W. S. W. of Elkton, and 59 SW. by W. of Philadelphia: from which it lies in Lon. 0. 54. W. Lat. 39. 34. N.

(5.) **Charleston**, a ſmall town of Kentucky, in Maſon county, ſeated at the confluence of Laurens creek, with the Ohio; 6 miles N. of Waſhington, and 60 NE. of Lexington.

(6.) **Charleston**, a village of Virginia in Berkley county, ſeated on the great road from Philadelphia to Wincheſter; 20 miles from the latter, and 8 from Shepherdſtown.

(7.) **Charleston**, or **Number Four**, a poſt town of New Hampſhire, ſeated on the E. ſide of the Connecticut, in Cheſhire county. It has a congregational church, a court houſe and an academy, which was incorporated in 1791. A ſuperior court is held in it, 3d Tueſ. in May, and a court of common pleas in Sept. and Dec. It lies 120 miles W. by N. of Portſmouth, and 341 NE. by N. of Philadelphia; being in Lon. 2. 41. E. and Lat. 42. 46. N. of that meridian.

(8.) **Charleston**, one of the four principal towns of Barbadoes.

(1.) **CHARLESTOWN**, the only town in the iſle of Nevis. On the S. ſide of it there is a large ſpot of ſulphureous ground at a chaſm called *Sulphur Gut*, the heat of which is ſo great as to be felt through the ſoles of one's ſhoes. A pond a quarter of a mile from the town is milk warm, yet it has excellent fiſh. Lon. 62. 42. W. Lat. 16. 55. N.

(2.) **Charlestown**, a townſhip of Maſſachuſetts, in Montgomery county, 32 miles W. of Schenectady.

(3.) **Charlestown**, a townſhip of Pennſylvania, in Cheſter county.

(4.) **Charlestown**, a townſhip of Rhode Iſland, in Waſhington county, 19 miles NW. of Newport. It contains 2022 inhabitants, of whom 12 are ſlaves; and about 400 native Indians, who ſpeak Engliſh.

(5.) **Charlestown**, a village of Scotland, in Fifeſhire, near Dunfermline, on the banks of the Forth, containing 487 inhabitants in 1792. It was founded in 1777, by Charles, earl of Elgin, the laſt proprietor. The earl's lime works here are the moſt extenſive in Britain, belonging to an individual. There are nine draw-kilns, a harbour, waggon ways, &c. the erection of which coſt 14,000 ſterling. About 90,000 tons of lime ſtone are quarried annually, from a ſeam about a mile in length from E. to W. and from 20 to 30 feet thick. About 200,000 bolls of ſhells, and 35,000 chalders of lime are ſold annually. The total annual value is about 10,000 l. From 30 to 50 veſſels are uſually lying at Charleſtown in ſummer, waiting their turns of loading.

(1.) **CHARLETON**, an iſland at the bottom of Hudſon's Bay, in North America, ſubject to Great Britain. Lon. 80. 0. W. Lat. 52. 30. N.

(2.) **Charleton**, a townſhip of Maſſachuſetts, in Worceſter county, 60 miles SW. of Boſton, containing 1965 citizens.

(3.) **Charleton**, a townſhip of New York, in Saratoga county.

(4.) **Charleton**, Walter, born in 1619, was phyſician in ordinary to Charles I. and Charles II. one of the firſt members of the Royal Society, and preſident of the college of phyſicians. He wrote on various ſubjects; but at laſt his narrow circumſtances obliged him to retire to the iſland of Jerſey, where he died in 1707.

(1.) CHARLEVILLE, a town of France, in the department of Ardennes, and ci-devant province of Champagne. The ſtreets are ſtraight, and the houſes of equal height. It has a magnificent ſquare, with a fountain in the centre. It is ſeated on the Meuſe near Mezieres, to which it is connected by a bridge and cauſeway; 15 miles N. W. of Sedan, 45 of Rheims, and 115 NE. of Paris. Lon. 4. 45. E. Lat. 49. 50. N.

(2.) Charleville, a town of Ireland, in the county of Cork, 30 miles N. of the city, and 112 SW. of Dublin. It ſends two members to parliament. Lon. 8. 30. W. Lat. 52. 23. N.

CHARLEVOIX, Peter, a French Jeſuit, born in 1689, was for ſeveral years a miſſionary in America, and wrote a Hiſtory of the iſland of St Domingo, 2 vols. 4to.; a Hiſtory and Deſcription of Japan, 2 vols. 4to.; and 6 vols. 12mo.; Hiſtory of Paraguay, 6 vols. 18mo; a General Hiſtory of New France, a valuable work, in 3 vols. 4to. He died in 1761.

(1.) CHARLEY, a town in Lancaſhire, ſeated on the ſpring head of the Char; 6 miles SE. of Preſton and 203 NW. of London. It has a market on Tueſday, and fairs May 5, Aug. 20, and Sept. 5. Lon. 2. 45. W. Lat. 53. 38. N.

(2.) Charley, 3 miles SW. of Walſal, Stafford.

(3.) Charley Forest. See Charnwood.

(4.) Charley Wood, in Hertfordſhire.

CHARLIEU, a town of France, in the department of Soane and Loire, and on the borders of the ci-devant province of Burgundy.

(1.) * CHARLOCK. *n. ſ.* A weed growing among the corn with a yellow flower. It is a ſpecies of a Mithridate muſtard.

(2.) Charlock, in botany. See Sinapi.

(3.) Charlock, white flowered. See Raphanus.

CHARLOTIA, a town of Eaſt Florida, ſituated on a rock, 18 feet perpendicular, above St John's river.

(1.) CHARLOTTE, a populous and fertile county of Virginia; bounded by Campbell county on the W. Prince-Edward and Buckingham on the N. Mecklenburgh on the SE. and Halifax and Pennſylvania counties on the S. It contained 5,262 free inhabitants, and 4,816 ſlaves in 1795.

(2.) Charlotte, a port town of N. Carolina, and the capital of Mecklenburgh county, ſituated on the Steel creek. A county court is held in it, the 4th Mon. of Jan. Apr. July and Oct. It is 44 miles SW. by S. of Saliſbury, and 606 W. SW. of Philadelphia: from which it lies in Lon. 5. 43. W. Lat. 35. 18. N.

(3.) Charlotte, a town on the W. ſide of Hiſpaniola.

(4.) Charlotte, a townſhip of Vermont, in Chittenden county, on the E. ſide of Lake Champlain, containing 635 citizens.

(5.) Charlotte, a river of E. Florida, which riſes from Lake Spiritu Santo, and falls into the Atlantic at Charlotte Haven.

Charlotte Burg, a town of North Carolina, in Brunſwick county, built on an iſland.

(1.) Charlotte, Fort, a fort in South Carolina, one mile below Fort James. Lon. 82. 35. W. Lat. 24. 0. N.

(2.) Chalotte, Fort, a ſmall fortification near the town of Lerwick in Shetland, ſaid to have been built in the days of Oliver Cromwell. It was repaired in 1781, under the direction of Capt. Fraſer, chief engineer in Scotland. It is now garriſoned by a company of ſoldiers; and completely commands the entrance to Braſſay ſound.

Charlotte Haven, a ſea port of Eaſt Florida, at the mouth of the Charlotte. Lon. 82. 40. W. Lat. 27. 0. N.

(1.) Charlotte Town, the capital of the iſland of St John's, in the Gulf of St Lawrence.

(2.) Charlotte Town, the capital of Dominica, formerly called Roſſeau. It ſtands on a point of land, on the SW. ſide of the iſland, which forms two bays, and is 21 miles SE. of Prince Rupert's bay. Lon. 61. 25. W. Lat. 15. 25. N.

CHARLOTTENBURG, a town of the electorate of Brandenburg, in the Middle Mark, with a royal palace, and magnificent gardens. It was built by Sophia Charlotte, the firſt queen of Pruſſia; and is ſituated on the river Spree, 4 miles ESE. of Berlin.

CHARLOTTESVILLE, a poſt town of Virginia, and the capital of Albemarle county; ſituated about half a mile N. of a branch of the Rivannah, and 3 miles W. of the South-Weſt Mountain. A diſtrict court is held in it, on the 15th April and Sept. and a county court the 2d Tueſ. of every month. It is 40 miles SE. by E. of Staunton; 86 WNW. of Richmond; and 303 S. W. by S. of Philadelphia: from which it lies in Lon. 3. 42. W. Lat. 38. 2. N.

CHARLSBURY, a town in Oxfordſhire 6 miles from Woodſtock, and 69 from London. It has four fairs.

(1.) CHARLTON, a village in Kent, ſeated on an eminence on the edge of Blackheath, that commands a fine view of the Thames. It is noted for a fair held on St Luke's day, called *Horn Fair;* the origin of which is traced by tradition from the reign of king John; who being detected in an amour, was obliged to purchaſe his ſafety from the injured huſband, by a grant of all the land from this place to *Cuckold's Point:* And he eſtabliſhed the fair as the tenure. Agreeably to ſuch a name and origin, horn wares of all kinds are ſold; the people wear horns on their heads; and all that licentiouſneſs prevails, which the royal example of the ancient monarch is thought ſufficient to authoriſe.

(2—21.) Charlton, the name of other 24 Engliſh towns and villages; viz. 1. in Berks, in the pariſh of Wantage: 2. in Devonſhire, S. of Dartmouth: 3. near Dorcheſter: 4. in Dorſetſhire, 3 miles from Sherburn: 5. in Glouceſterſhire, near Cirenceſter: 6. in ditto, near Henbury: 7. in Hampſhire, near Andover: 8. in ditto, between Clanfield and Compton: 9. in Kent, near Dover: 10. in Middleſex, between Hampton and Sunbury: 11. in Northamptonſhire, near Oxfordſhire: 12. in Oxfordſhire, between Woodſtock and Piddington : 13. in Somerſetſhire, S. of Keynſham : 14. in Staffordſhire, near Swinnerton : 15. in Suſſex, 3 m. E. of Goodwood : 16. in Wilts, near Dorſetſhire : 17. in ditto, near Downton : 18. in ditto, 2 miles E. of Malmſbury : 19. in ditto, near Up-haven : 20. in Worceſterſhire, near Eveſham :—

(22.) CHARLTON, EAST, near Somerton.

(23.) CHARLTON, NORTH, } in Tinedale vale,
(24.) CHARLTON, SOUTH, } Northumberland.

(25.) CHARLTON, WEST, in Somerſetſhire, near Somerton.

CHARLTON-ABBOTS, in Glouceſterſhire, 2 miles SE. of Winchcomb.

CHARLTON-CANVILE, E. of Queen-Camel in Somerſetſhire.

CHARLTON-MARSHALL, in Dorſetſhire, a mile NW. of Spettiſbury.

CHARLTON-MUSGRAVE, in Somerſetſhire, near Bruton.

CHARLWOOD, in Surry, S. of Ryegate.

(1.) * CHARM. *n. ſ.* [*charme*, Fr. *carmen*, Lat.] 1. Words, or philtres, or characters, imagined to have ſome occult or unintelligible power.—I never knew a woman ſo dote upon a man; ſurely I think you have *charms*.—Not I, I aſſure thee; ſetting the attraction of my good parts aſide, I have no other *charms*. *Shakeſpeare.*—There have been uſed either barbarous words, of no ſenſe, leſt they ſhould diſturb the imagination, or words of ſimilitude, that may ſecond and feed the imagination: and this was ever as well in heathen *charms*, as in *charms* of later times. *Bacon.* 2. Something of power to ſubdue oppoſition, and gain the affections; ſomething that can pleaſe irreſiſtibly.—

Well ſounding verſes are the *charms* we uſe,
Heroick thoughts and virtue to infuſe. *Roſcom.*

* *To* CHARM. *v. a.* [from the noun.] 1. To fortify with charms againſt evil.—

Let fall thy vulnerable creſts,
I bear a *charmed* life, which muſt not yield
To one of woman born. *Shakeſpeare.*

2. To make powerful by charms. 3. To ſummon by incantation.—

Upon my knees
I *charm* you by my once commended beauty,
By all your vows of love, and that great vow
Which did incorporate and make us one. *Shak.*

4. To ſubdue by ſome ſecret power; to amaze; to overpower.—

I, in mine own woe *charm'd*,
Cuold not find death, where I did hear him groan;
Nor feel him where he ſtruck. *Shakeſpeare.*
Muſick the fierceſt grief can *charm*. *Pope.*

3. To ſubdue the mind by pleaſure.—

'Tis your graces
That from my muteſt conſcience to my tongue,
Charms this report out. *Shakeſpeare.*

* CHARMED. *adj.* Enchanted.—Arcadia was the *charmed* circle, where all his ſpirits for ever ſhould be enchanted. *Sidney.*

* CHARMER. *n. ſ.* [from *charm.*] 1. One that has the power of charms, or enchantments.—

That handkerchief
Did an Egyptian to my mother give;
She was a *charmer*, and could almoſt read
The thoughts of people. *Shakeſpeare.*

2. Word of endearment among lovers.

CHARMES, a town of France in the department of Voſges, and ci-devant province of Lorrain; ſeated on the Moſelle, over which it has a bridge; 8. miles E. of Mirecourt. Lon. 6. 17. E. Lat. 48. 21 N.

* CHARMING. *particip. adj.* [from *charm.*] Pleaſing in the higheſt degree.—For ever all goodneſs will be *charming*, for ever all wickedneſs will be moſt odious. *Spratt.*—

O *charming* youth! in the firſt op'ning page,
So many graces in ſo green an age. *Dryden.*

* CHARMINGLY. *adv.* [from *charming.*] In ſuch a manner as to pleaſe exceedingly.—She ſmiled very *charmingly*, and diſcovered as fine a ſet of teeth as ever eye beheld. *Addiſon.*

* CHARMINGNESS *n. ſ.* [from *charming.*] The power of pleaſing.

CHARMINSTER, a town near Dorcheſter.

CHARMOUTH, a village in Dorſetſhire, at the mouth of the Char, NE. of Lyme; at the foot of a hill, which is 1005 feet high, and oppoſite to another of 970 feet.

* CHARNEL. *adj.* [*charnel*, Fr.] Containing fleſh, or carcaſes.—

Such are thoſe thick and gloomy ſhadows damp
Oft found in *charnel* vaults, and ſepulchres,
Ling'ring and ſitting by a new made grave.
Milton.

(1.) * CHARNEL-HOUSE. *n. ſ.* [*charnier*, Fr. from *caro, carnis*, Latin.] The place under churches where the bones of the dead are repoſited.—

If *charnel-houſes* and our graves muſt ſend
Thoſe, that we bury, back; our monuments
Shall be the maws of kites. *Shakeſpeare.*

(2.) CHARNEL HOUSES were anciently a kind of galleries, uſually in or near a church-yard, over which were laid the bones of the dead, after the fleſh was wholly conſumed. Charnel houſes are now uſually adjoinnig to the church.

CHARNES, a town near Eccleſhall, Stafford.

CHARNET, in Eland, Northumberland.

CHARNEY, 2 miles from Deachworth, Berks.

CHARNHAM, near Hungerford, Wilts.

CHARNCOCK, near Burgh, Lancaſhire.

CHARNWOOD, or CHARLEY FOREST, a rough open tract in the NW. part of Leiceſterſhire, near Barden hills.

CHAROLLES, a town of France, in the department of Saon and Loire, and ci-devant province of Burgundy; ſeated on the Reçonce, 24 miles WNW. of Marçon. Lon. 4. 24. E. Lat. 46. 28. N.

CHAROLLOIS, a ci-devant territory of France, in Burgandy, now included in the department of Saone and Loire.

CHARON, in fabulous hiſtory, the ſon of Erebus and Nox, whoſe office was to ferry the ſouls of the deceaſed over the waters of Styx and Acheron, to the infernal regions, for an obolus. Such as had not been honoured with a funeral, were not allowed to enter his boat till they had wandered one hundred years on ſhore. If any living perſon preſented himſelf to croſs the Stygian lake, he could not be admitted till he ſhowed Charon a golden bough, which he received from the Sibyl; and Charon himſelf was confined one year in priſon, for having ferried over againſt his own will, Hercules, without this paſſport. Charon is repreſented as an old robuſt man, with a frightful countenance, a long grey beard, piercing eyes, a wrinkled forehead, and a filthy ragged garment. As all the dead were obliged to pay a ſmall piece of money for their paſſage, the Pagans generally placed under the tongue of the deceaſed a piece of money for Charon. The fable of Charon and his boat ſeems to have been borrowed from the Egyptians, who carried their dead acroſs a lake, and there paſſed ſentennce upon them, according to their good or bad actions, honouring them with a ſplendid funeral, or leaving them expoſed in the open air.

CHARONDAS, a celebrated legiſlator of the Thurians, and a native of Catanea in Sicily, flouriſhed A. A. C. 446. He forbad any perſon's appearing armed in the public aſſemblies of the nation; but one day going thither in haſte, without thinking of his ſword, he was no ſooner made to obſerve his miſtake than he ran it through his body.

CHAROST, a town of France, in the department of Indre, and ci-devant province of Berry; ſeated on the river Arnon. Lon. 2. 10. E. Lat. 47. 5. N.

(1.) CHAROUX, a town of France, in the department of Allier, the ci-devant province of Bourbonnois, ſeated on an eminence, near the river Sioulle. Lon. 3. 15. E. Lat. 46. 10. N.

(2.) CHAROUX, a town of France, in the ci-devant province of Poitou, near the Charente.

CHARPENTIER, Francis, dean of the French academy, was born in 1620. M. Colbert made uſe of his abilities in eſtabliſhing his Academy of Medals and Inſcriptions; and no perſon of that learned ſociety contributed more toward that ſuperb ſeries of medals, which were ſtruck on the events that diſtinguiſhed the reign of Louis XIV. He publiſhed, 1. The Life of Socrates; 1650. 2, 3. Tranſlations of Xenophon's *Memorabilia* and *Cyropædia*, 1558; 4. An account of the French Eaſt India Company, 1665: and, 5, 6. Two works on the Excellency of the French Language; with ſome other pieces, which were all well received. He died in 1702, aged 82.

CHARR, in ichthyology. See SALMO.

CHARRINGWORTH, a village in Glouceſterſhire, near Cambden and Moreton.

CHARRON, Peter, the author of a book intitled *Of Wiſdom*, which gained him great reputation, was born at Paris in 1541. After being advocate in the parliament of Paris for 5 or 6 years, he applied himſelf to divinity; and became ſo great a preacher, that the biſhops of ſeveral dioceſes offered him the higheſt dignities in their gift. He died at Paris, ſuddenly in the ſtreet, Nov. 16. 1603.

CHARSFIELD, a town near Wickham, Suffolk.

(I.) * CHART, *n. ſ.* [*charta*, Lat.] A delineation or map of coaſts, for the uſe of ſailors. It is diſtinguiſhed from a *map*, by repreſenting only the coaſts.—The Portugueſe, when they had doubled the Cape of Good Hope, found ſkilful pilates, uſing aſtronomical inſtruments, geographical *charts*, and compaſſes. *Arbuthnot*.

(II.) CHART, in geography, the name of three villages; viz,

1. CHART, in Surry, 5 miles from Godalming:
2. CHART, GREAT, } in Kent, near Aſhford
3. CHART, LITTLE, } and Charing.

(III.) CHART, in hydrography, or SEA CHART, (§ I.) is a projection of ſome part of the earth's ſuperfices *in plano*. Sea charts differ very conſiderably from geographical or land maps, which are of no uſe in navigation. They are of different kinds; ſuch as,

1. CHART, GLOBULAR, a meridional projection, wherein the diſtance of the eye from the plane of the meridian, upon which the projection is made, is ſuppoſed to be equal to the line of the angle 45°. This projection comes the neareſt of all to the nature of the globe, becauſe the meridians therein are placed at equal diſtances; the parallels alſo are nearly equidiſtant, and conſequently the ſeveral parts of the earth have their proper proportion of magnitude, diſtance, and ſituation, nearly the ſame as on the globe itſelf. See GLOBULAR PROJECTION.

2. CHART, HYDROGRAPHIC, a ſheet of large paper, whereon ſeveral parts of the land and ſea are deſcribed, with their reſpective coaſts, harbours, ſounds, flats, rocks, ſhelves, ſand, &c. together with the longitude and latitude of each place, and the points of the compaſs. See N° 3.

3. CHART, MERCATOR'S, is that where the meridians are ſtraight lines, parallel to each other, and equidiſtant; the parallels are alſo ſtraight lines, and parallel to each other: but the diſtance between them increaſes from the equinoctial towards either pole, in the ratio of the ſecant of the latitude to the radius. Suppoſe the ſuperficies of the terreſtrial globe to be taken off, and extended on a plane, ſo as to make the meridians parallel to each other, and the degrees of longitude every where equal, it is eaſy to conceive that it muſt be productive of the moſt palpable errors; for an iſland in latitude 60° where the radius of the parallel is only equal to one half of the radius of the equator, will have its length from E. to W. diſtorted in a double ratio to what it was on the globe; i. e. its length from E. to W. compared with its breadth from N. to S. will appear in a double proportion to what it is in reality: ſo that, in whatever proportion the degrees of any parallel are increaſed, or diminiſhed by a projection in plano, the degrees of longitude ought to be increaſed or diminiſhed in the ſame ratio; otherwiſe the true bearings of places will be loſt, as in the caſe of the plane chart, where the degrees of latitude and longitude are all equal. Although this projection is commonly called *Mercator's projection*, yet our countryman, Mr Wright, had long before invented it, demonſtrated its uſe, and ſhewn a ready way of conſtructing it, by enlarging the meridian line, by a continued addition of ſecants; neither of theſe gentlemen, however, originally gave the idea of it, for it was hinted by Ptolemy about two thouſand years ago. See NAVIGATION.

4. CHART, PLANE, is a repreſentation of ſome ſmall parts of the earth only, or of ſome particular places, without regard to its relative ſituation.

(IV.) CHART, SELENOGRAPHIC, a particular deſcription of the ſpots, appearances &c. of the moon. See ASTRONOMY, *Index*.

(V.) **Chart, Topographic**, a draught of ſome ſmall parts of the earth only, or of ſome particular places, without regard to its relative ſituation.

(1) **CHARAT**, [χαρτης,] originally ſignifies a ſort of paper made of the plant *papyrus* or *biblus*. See Paper. The word is alſo uſed in our ancient cuſtoms for a charter, or deed in writing. See Charter, N° 1.

(2.) **Charta emporetica**, in pharmacy, &c. a kind of paper made very ſoft and porous, uſed to filter withal. See Filtration, &c.

(3.) **Charta Magna.** See Magna Charta.

CHARTARIUS. See Chartophylax.

(1.) * **CHARTER.** *n. ſ.* [*charta*, Lat.] 1. A *charter* is a written evidence of things done between man and man. *Charters* are divided into *charters* of the king, and *charters* of private perſons. *Charters* of the king are thoſe, whereby the king paſſeth any grant to any perſon or more, or to any body politick: as a *charter* of exemption, that no man ſhall be empannelled on a jury; *charter* of pardon, whereby a man is forgiven a felony, or other offence. *Cowel.* 2. Any writing beſtowing privileges or rights.—

If you deny it, let the danger light
Upon your *charter*, and your city's freedom.
Shakeſpeare.

3. Privilege; immunity; exemption.—

My mother,
Who has a *charter* to extol her blood,
When ſhe does praiſe me, grieves me. *Shakeſp.*

(2.) **Charter government.** See Colony.

(3.) **Charter land**, ſuch land as a perſon holds by charter; that is, by evidence in writing, otherwiſe called Freehold.

(4.) **Charter of the forest**, a charter containing the laws of the foreſt; ſuch as the charter of Canute, &c.

* **CHARTERED.** *adj.* [from *charter.*] Inveſted with privileges by charter; privileged.—

When he ſpeaks,
The air, a *charter'd* libertine, is ſtill. *Shakeſp.*

CHARTERHAY, a village in Dorſetſhire, 2 miles W. of Abbot's Stoke.

(1.) **CHARTER-HOUSE.** See Chartreuse, N° 2.

(2, 3.) **Charter-house**, two villages: 1. N. of Mendip Hills, between Chedder rocks and Eaſt Hartry: 2. in Somerſetſh. 3 miles NE. of Bruton.

Charter-Island, an iſland of England, in the Thames, near Runny-Mead, ſo named from its having been the ſpot where King John ſubſcribed the Magna Charta.

(1.) * **CHARTER-PARTY.** *n. ſ.* [*chartre partie*, Fr.] A paper relating to a contract, of which each party has a copy.—*Charter parties*, or contracts, made even upon the high ſea, touching things that are not in their own nature maritime, belong not to the admiral's juriſdiction. *Hale.*

(2.) **Charter-party.** See Freight, &c. The charter-party muſt be in writing; and be ſigned both by the proprietor or the maſter of the ſhip, and the merchant who freights it. It ſhould contain the name and the burden of the veſſel; the names of the maſter and the freighter; the price or rate of freight; and the time of loading and unloading; and the other conditions agreed on. It is properly a deed, whereby the maſter or proprietor of the veſſel engages to furniſh immediately a tight ſound veſſel well equipped, caulked, and ſtopped, provided with anchors, ſails, cordage, and all other furniture to make the voyage required, as equipage, hands, victuals, and other munitions: in conſideration of a certain ſum to be paid by the merchant for the freight. Laſtly, the ſhip with all its furniture, and the cargo, are reſpectively ſubjected to the conditions of the charter-party. The charter-party differs from a *bill of lading*, in that the firſt is for the entire freight, both going and returning; whereas the latter is only for a part of the freight, or at moſt only for the voyage one way. Boyer ſays, the word comes from hence, that *per medium charta incidebatur, et ſic fiebat charta partita;* becauſe, when notaries were leſs common, there was only one inſtrument made for both parties: this they cut in two, and gave each his portion; joining them together at their return, to know if each had done his part. This he ſays he has ſeen practiſed in his time; agreeable to the method of the Romans, who, in their ſtipulations, uſed to break a ſtaff, each party retaining a moiety thereof as a mark.

CHARTHAM, a town 3 miles from Canterbury.

CHARTIER, a townſhip of Pennſylvania, in Waſhington county.

Chartiers, a river in Pennſylvania, which runs into the Ohio, a few miles below Pittſburg.

CHART-JUXTA, a town near Maidſtone, Kent.

CHARTLEY Castle, 2 miles NE of Stafford.

CHARTOPHYLACIUM, a place where records are kept.

(1.) **CHARTOPHYLAX**, an officer of the church of Conſtantinople, who, when the ſacrament is adminiſtered, gives notice to the prieſts to come to the table. He repreſents the patriarch upon the bench, tries all eccleſiaſtical cauſes, keeps the marriage regiſters, aſſiſts at the conſecration of biſhops, and preſents the biſhop elect, and all other ſubordinate clergy.

(2.) **Chartophylax.** See Cimeliophylax.

CHARTRES, an ancient and large town of France, in the department of Eure and Loire, and ci-devant province of Beauce. Its ancient name was Autricum. Its principal trade is in corn. It has two hoſpitals, one for 120 blind perſons. The cathedral is one of the fineſt in France, and its ſteeple is much admired. It is ſeated on the Eure, 45 miles SW. of Paris. Lon. 1. 34. E. Lat. 48. 27. N.

(1) **CHARTREUSE**, or the Grand Chartreuse, a late celebrated monaſtery, the capital of all the ci-devant convents of the Carthuſian monks, about 7 miles NE. of Grenoble, in the ci-devant province of Dauphine, now in the department of Iſere. The ſituation of this place has been much admired and celebrated, being one of the moſt romantic and beautiful ſcenes to be ſeen in the whole range of the Alps. From Echelles, a little village in the mountains of Savoy, to the Chartreuſe, which is built on a mountain of the ſame name, the diſtance is 6 miles. Along this courſe, the road runs winding up for the moſt part not 6 feet broad. On one hand is the rock

with woods of pine tree hanging over head; on the other a prodigious precipice almoſt perpendicular; at the bottom of which rolls a torrent, that, ſometimes tumbling among the fragments of ſtone which have fallen from on high, and ſometimes precipitating itſelf down vaſt deſcents, with noiſe like thunder, rendered yet more tremendous by the echo from the mountains on each ſide, concurs to form one of the moſt ſolemn the moſt romantic, and moſt aſtoniſhing ſcenes in nature. The ſtrange views made by the craggs, and cliffs, and the numerous caſcades which throw themſelves from the very ſummit down to the vale, all contribute to the grandeur of this ſcene. On the top of the mountain is the convent, which was founded by Bruno about the year 1684. The inhabitants conſiſted of 100 fathers with 300 ſervants] who grinded their corn, preſſed their wine, and performed every domeſtic office, even to the making of their clothes. The building is ſo large that there were lodgings for all the deputies of the order through out France, who met here once a year. At the revolution it was converted into a knid of arſenal. Lon. 5. 5. E. Lat. 45. 20. N.

(2.) CHARTREUSE OF LONDON, corruptly called the CHARTER-HOUSE, took its name from the Grand Chartreuſe, (N° 1.) but is now converted into an hoſpital, and endowed with a revenue of 6000 l. a year. Here are maintained 80 decayed gentlemen, not under 50 years of age: alſo 40 boys are educated and fitted either for the univerſity or trades. Thoſe ſent to the univerſity have an exhibition of 20 l. a-year for 8 years; and have an immediate title to 9 churchlivings in the gift of the governors of the hoſpital, who are 16 in number, all perſons of the firſt diſtinction, and take their turns in the nomination of penſioners and ſcholars.

CHARTULARIUS, } an ancient officer in the
CHARTULARY, } Latin church, who had the care of charters and papers relating to public affairs. He alſo preſided in eccleſiaſtical cauſes, inſtead of the pope. See CHARTOPHYLAX, and CEIMELIOPHYLAX.

CHARWELL, a river in Northamptonſhire.

CHARWELTON, a town in Northamptonſh. between Banbury and Daventry, ſeated on the Charwell.

* CHAR-WOMAN. *n. ſ.* [*char* and *woman.*] A woman hired accidentally for odd work or ſingle days.—Get three or four *char-women* to attend you conſtantly in the kitchen, whom you pay only with the broken meat, a few coals and all the cinders. *Swift.*

* CHARY. *adj.* [from *care.*] Careful; cautious; wary; frugal.—Over his kindred he held a wary and *chary* care, which bountifully was expreſſed, when occaſion ſo required. *Carew.*—

The *chârieſt* maid is prodigal enough,
If ſhe unmaſk her beauty to the moon. *Shak.*

CHARYBDIS, in ancient geography, a famous whirlpool in the ſtrait of Meſſina, lying between Calabria in Italy and the iſland of Sicily, oppoſite to Scylla, a dangerous rock on the coaſt of Italy, againſt which mariners were often daſhed in endeavouring to avoid Charybdis; whence the Latin adage,

Incidit in Scyllam *qui vult vitare* Charybdin.

Thucydides makes it to be only a ſtrong flux and reflux in the ſtrait, or a violent reciprocation of the tide, eſpecially when the wind ſet ſouth. But on diving into the Charybdis, vaſt gulphs and whirlpools have been found below, which produced all the commotion on the ſurface of the water. Charybdis is metaphorically uſed by Horace for a rapacious proſtitute. This whirlpool is ſaid to have been entirely removed by the dreadful earthquake in 1783.

(1.) * CHASE. *n. ſ.* [from the verb.] 1. Hunting: as, the pleaſures of the *chaſe.* 2. Purſuit of any thing as game.—

Whilſt he was haſt'ning, in the *chaſe*, it ſeems,
Of this fair couple, meets he on the way,
The father of this ſeeming lady. *Shakeſpeare.*

3. Fitneſs to be hunted, appropriation to *chaſe*, or ſport.—Concerning the beaſts of *chaſe*, whereof the buck is the firſt, he is called the firſt year a fawn. *Shakeſpeare.* 4. Purſuit of an enemy, or of ſomething noxious.—The admiral, with ſuch ſhips only as could ſuddenly be put in readineſs, made forth with them, and gave them *chaſe. Bacon.*—He ſailled out upon them with certain troops of horſemen, with ſuch violence, that he overthrew them, and, having them in *chaſe*, did ſpeedy execution. *Knolles.* 5. Purſuit of ſomething as deſirable.—

Yet this mad *chaſe* of fame, by few purſu'd,
Has drawn deſtruction on the multitude. *Dryd.*

6. The game hunted.—She, ſeeing the towering of her purſued *chaſe*, went circling about, riſing ſo with the leſs ſenſe of riſing. *Sidney.*—

Honour's the nobleſt chaſe; purſue that game,
And recompenſe the loſs of love with fame.
Granville.

7. Open ground ſtored with ſuch beaſts as are hunted.—A receptacle for deer and game, of a middle nature between a foreſt and a park; being commonly leſs than a foreſt, and not endued with ſo many liberties: and yet of a larger compaſs, and ſtored with greater diverſity of game than a park. A *chaſe* differs from a foreſt in this, becauſe it may be in the hands of a ſubject, which a foreſt, in its proper nature, cannot: and from a park, in that it is not incloſed, and hath not only a larger compaſs, and more ſtore of game, but likewiſe more keepers and overſeers. *Cowel.*—

He and his lady both are at the lodge,
Upon the north ſide of this pleaſant *chaſe. Shak.*

8. *The* CHASE *of a gun*, is the whole bore or length of a piece, taken withinſide. *Chambers.*

(2.) CHASE, § 1. *Def.* 1. See HUNTING.

(3.) CHASE, or CHACE, in law, is uſed for a driving of cattle to or from any place; as to a diſtreſs, or fortlet, &c.

(4.) CHASES, or CHACES, (as defined § 1. *def.* 7.) want courts of attachment ſwainmote, and juſtice-ſeat. See FOREST. Crompton obſerves that a foreſt cannot be in the hands of a ſubject, but it fortwith loſes its name, and becomes a *chaſe*; as all thoſe courts loſe their nature when they come into the hands of a ſubject; and that none but a king can make a lord chief juſtice in eyre of the foreſt. See JUSTICE IN EYRE.

(5.) CHASE, STERN. See *To* CHASE, N° 2.

(6.) CHASE, WILD-GOOSE. See WILD-GOOSE.

(1.) * *To* CHASE. *v. a.* [*chaſſer*, Fr.] 1. To hunt.—It ſhall be as the *chaſed* roe. *Iſaiah.*—Mine enemies *chaſed* me ſore like a bird. *Lament.* 2. To purſue as an enemy.—And Abimelech *chaſed* him, and he fled before him. *Judges.*—One of you ſhall *chaſe* a thouſand. *Deut.* 3. To drive away.—He that *chaſeth* away his mother, is a ſon that cauſeth ſhame. *Proverbs.* 4. To follow as a thing deſirable. 5. To drive.—Thus *chaſed* by their brother's endleſs malice, from prince to prince, and from place to place, they, for their ſafety, fled at laſt to the city of Biſennis. *Knolles.*—

When the following morn had *chas'd* away
The flying ſtars, and light reſtor'd the day.
Dryden.

(2.) *To* Chase, in the ſea language, or *To* give Chase, is to purſue a ſhip. Stern Chase, is when the chaſer follows the chaſed aſtern directly upon the ſame point of the compaſs. *To lie with a ſhip's fore foot in a* Chase, is to ſail and meet with her by the neareſt diſtance; and ſo to croſs her in the way, or to come acroſs her fore-foot. A ſhip is ſaid to have a *good chaſe*, when ſhe is ſo built foreward on, or a-ſtern, that ſhe can carry many guns to ſhoot forewards or backwards; according to which ſhe is ſaid to have a *good foreward*, or *good ſtern chaſe*.

(3.) * *To* Chase metals. See *To* Enchase.

(1.) * Chase-gun. *n. ſ.* [from *chaſe* and *gun*.] Guns in the forepart of the ſhip, fired upon thoſe that are purſued.—

Mean time the Belgians tack upon our rear,
And raking *chaſe-guns* through our ſtern they ſend.
Dryden.

(2.) Chase-guns are alſo placed in the ſtern, where they are only uſeful, when chaſed by any other ſhip.

CHASELEY, 2 villages: 1. in Glouceſterſhire, between Glouceſter and Upton: 2. near Ridmarley, Worceſter.

(1.) * CHASER. *n. ſ.* [from *chaſe*.] Hunter; purſuer; driver.—

Then began
A ſtop i' th' *chaſer*; a retire; anon
A rout, confuſion thick. *Shakeſpeare.*

(2.) Chaser, one who enchaſes plate.

CHASFRENCH, a village in the county of Cornwall, SE. of Leſkard.

CHASING of metals. See Enchasing.

* CHASM. *n. ſ.* [χασμα.] 1. A breach uncloſed; a cleft; a gap; an opening.—In all that viſible corporeal world, we ſee no *chaſms* or gaps. *Locke.*—The water of this orb communicates with that of the ocean, by means of certain hiatuſes or *chaſms* paſſing betwixt it and the bottom of the ocean. *Woodward.* 2. A place unfilled; a vacuity.—

Some lazy ages, loſt in eaſe,
No action leave to buſy chronicles;
Such, whoſe ſupine felicity but makes
In ſtory *chaſms*, in epochas miſtakes. *Dryden.*

* CHASSELAS. *n. ſ.* [French.] A ſort of grape.

* CHASTE. *adj.* [*chaſte*, Fr. *caſtus*, Lat.] 1. Pure from all commerce of ſexes; as, a *chaſte* virgin.—Diana *chaſte*, and Hebe fair. *Prior.* 2. With reſpect to language; pure; uncorrupt; not mixed with barbarous phraſes. 3. Free from obſcenity.—Among words which ſignify the ſame principal ideas, ſome are clean and decent, others unclean; ſome *chaſte*, others obſcene. *Watt's Logick.* 4. True to the marriage bed.—Love your children be diſcreet, *chaſte*, keepers at home. *Titus.*

CHASTEAU, a town of France, in the department of Maine and Loire, and ci-devant province of Anjou.

* CHASTELY. *adv.* [from *chaſte*.] Without incontinence; purely; without contamination.—You ſhould not paſs here: no, though it were as virtuous to lie as to live *chaſtely*. *Shakeſpeare.*

* *To* CHASTEN. *v. a.* [*chaſtier*, Fr. *caſtigo*, Lat.] To correct; to puniſh; to mortify.—*Chaſten* thy ſon while there is hope, and let not thy ſoul ſpare for his crying. *Proverbs.*

(1.) * CHASTE-TREE. *n. ſ.* [*vitex*, Lat.] This tree will grow to be 8 or 10 feet high, and produce ſpikes of flowers at the extremity of every ſtrong ſhoot in autumn. *Miller.*

(2.) Chaste-tree, in botany. See Agnus Castus, and Vitex.

* *To* CHASTISE. *v. a.* [*caſtigo*, Lat. anciently accented on the firſt ſyllable, now on the laſt.] 1. To puniſh; to correct by puniſhment; to afflict for faults.—

My breaſt I'll burſt with ſtraining of my courage,
But I will *chaſtiſe* this high-minded ſtrumpet.
Shakeſpeare.

2. To reduce to order, or obedience; to repreſs; to reſtrain; to awe.—

Hie thee hither,
That I may pour my ſpirits in thine ear,
And *chaſtiſe*, with the valour of my tongue,
All that impedes thee. *Shakeſpeare.*

* CHASTISEMENT. *n. ſ.* [*chaſtiment*, Fr.] Correction; puniſhment: commonly, though not always, uſed of domeſtick or parental puniſhment.—

Shall I ſo much diſhonour my fair ſtars,
On equal terms to give him *chaſtiſement*. *Shakeſ.*

* CHASTISER. *n. ſ.* [from *chaſtiſe*.] The perſon that chaſtiſes; a puniſher; a corrector.

(1.) * CHASTITY. *n. ſ.* [*caſtitas*, Lat.] 1. Purity of the body.—*Chaſtity* is either abſtinence or continence: abſtinence is that of virgins or widows continence of married perſons: chaſte marriages are honourable and pleaſing to God. *Taylor.* 2. Freedom from obſcenity.—

There is not *chaſtity* enough in language,
Without offence to utter them. *Shak.*

(2.) Chastity is a virtue univerſally celebrated. There is indeed no charm in the female ſex that can ſupply its place. Without it, beauty loſes its luſtre, and rank is contemptible; good breeding degenerates into wantonneſs, and wit into impudence. Out of the numerous inſtances of eminent chaſtity recorded by authors, we ſhall only call the reader's attention to two, viz. *Chiomara* and *Lucretia*; the former of whom, though not ſo frequently celebrated, certainly acted a wiſer part than the latter, by taking vengeance of her raviſher inſtead of herſelf. See Chiomara, and Lucretia.

(3.) Chastity in men is termed *continence*. See Continence.

(4.) Chastity, laws respecting. The Roman law juſtifies homicide in defence of the chaſtity either of one's ſelf or relations; and ſo alſo ſtood the law in the Jewiſh republic. Our law likewiſe juſtifie a woman for killing a man who attempts to raviſh her. Even the huſband or father may kill a man who attempts a rape upon his wife or daughter; but not if he takes them in adultery by conſent: for the one is forcible and felonious, but not the other.

* CHASTENESS *n.ſ.* [from *chaſte.*] Chaſtity; purity.

(1.) * CHAT. *n.ſ.* [from the verb.] Idle talk; prate; ſlight or negligent tattle.—

Snuff, or the fan, ſupplies each pauſe of *chat*,
With ſinging, laughing, ogling, and all that. *Pope.*

(2.) * CHAT. *n.ſ.* The keys of trees are called *chats*; as, aſh *chats*.

(1.) * *To* CHAT. *v. a.* To talk of. Not in uſe, unleſs ludicrouſly.—

All tongues ſpeak of him, and the bleared ſights
Are ſpectacled to ſee him. Your prattling nurſe
Into a rapture lets her baby cry,
While ſhe *chats* him. *Shakeſpeare.*

(2.) * *To* CHAT. *v. n.* [from *coqueter*, Fr. *Skinner*; perhaps from *achat*, purchaſe or cheapening, on account of the prate naturally produced in a bargain; or only, as it is moſt likely, contracted from *chatter.*] To prate; to talk idly; to prattle; to cackle; to chatter; to converſe at eaſe.—

The ſhepherds on the lawn
Sat ſimply *chatting* in a ruſtic row. *Milton.*

CHATANGA, a river of Ruſſian Tartary, which falls into the Frozen Ocean.

CHATE. See CHATEL.

CHATEAU, [Fr. a caſtle, pronounced *ſhato*,] makes part of the name of 20 towns in France, and 1 fort in Piedmont; viz.

1. CHATEAU-BRIANT, in the department of Lower Loire, and ci-devant province of Brittany, with an old caſtle; 24 miles S. of Rennes. Lon. 1. 16. W. Lat. 47. 46. N.

2. CHATEAU-CAMBRESIS, in the department of Lower Loire, and late province of Cambreſis. It has a magnificent palace, which belonged to the ci-devant archiepiſcopal ſee of Cambray; and is famous for the treaty concluded between Henry II. of France, and Philip II. of Spain. It is ſeated on the Selle, 12 miles SE. of Cambray. Lon. 3. 25. E. Lat. 50. 6. N.

3. CHATEAU CHINON, in the department of Nievre, and ci-devant province of Nivernois. It has a conſiderable manufacture of cloth; and is ſeated near the ſource of the Yonne, 36 miles E. of Nevers. Lon. 4. 8. E. Lat. 47. 0. N.

4. CHATEAU-DAUPHIN, a very ſtrong caſtle of Piedmont in the marquiſate of Saluces, belonging to the king of Sardinia. It was taken by the combined army of France and Spain in 1744, and was reſtored by the treaty of Aix-la-Chapelle. Lon. 6. 40. E. Lat. 44. 30. N.

5. CHATEAU DU LOIRE, a town of France, in the department of Sarte, and ci-devant province of Maine, famous for ſuſtaining a ſiege of 7 years againſt Herbert count Mans. It is ſeated on the Loire, 22 miles, SE. of Mans, and 97 W. of Paris. Lon. 0. 30. E. Lat. 47. 40. N.

6. CHATEAU-DUN, in the department of Eure and Loire, the late province of Beauce. It has a famous church built by the count Dunois, in the treaſury of which were depoſited the magnificent croſs of gold enriched with precious ſtones, and the glaſs vaſe, with Charlemagne's name on it, which that monarch got as a preſent from Aaron king of Perſia. The ſtreets of this town are ſtraight, the houſes uniform, and the great ſquare very ſpacious. The caſtle is ſeated on an eminence near the Loire, 30 miles N. of Blois, and 72 SW. of Paris. Lon. 1. 22. E. Lat. 48. 4. N.

7. CHATEAU-GONTIER, in the ci-devant province, now the department of Maine. It has a mineral ſpring and carries on the linen trade. It is ſeated on the Maine, 22 miles NW. of Angers, and 147 SW. of Paris. Lon. 0. 36. E. Lat. 47. 47. N.

8. CHATEAU-LANDON, in the department of Seine and Marne, and late province of the Iſle of France. It is ſeated on a hill 5 miles S. of Nemours, and 50 S. by E. of Paris. Lon. 2. 38. E. Lat. 48. 11. N.

9. CHATEAULIN, in the department of Finiſterre, and ci-devant province of Brittany. It is ſeated on the Auzon, where there is a ſalmon fiſhery, 18 miles N. of Quimper.

10. CHATEAU-MEILLANT, in the department of Cher, and late province of Berry. It is 9 miles E. of La Chatre; and its caſtle and tower are ſaid to have been built by Julius Cæſar.

11—15. CHATEAU-NEUF, the name of 5 towns; i. in the department of Charente, and ci-devant province of Angoumois, ſeated on the Charente, 10 miles from Angouleſme, and 5 from Jannac: ii. in the dep. of Cher, and late prov. of Berry, ſeated on the Cher, 16 miles S. of Bourges: iii. in the dep. of Eure and Loire, and ci-devant prov. of Beauce, 12 miles NE. of Chartres: iv. in the dep. of Maine and Loire, and late prov. of Berry, ſeated on the Sarte, 12 miles from Angers: and, v. in the dep. of Orne, and ci-devant province of Perche.

46. CHATEAU-PORTIEN, in the department of Ardennes, and ci-devant province of Champagne; with a caſtle built on a rock, near the river Aine. Lon. 4. 23. E. Lat. 49. 35. N.

17, 18. CHATEAU-RENAUD, two towns; viz. i. in the department of Indre and Loire, late the province of Touraine, 20 miles NW. of Amboiſe, and 88 SW. of Paris: Lon. 1. 1. W. Lat. 47. 33. N. and, ii. in the dep. of Loiret, and ci-devant prov. of Gatinois. This town is noted for its trade in ſaffron. Lon. 2. 25. E. Lat. 48. 0. N.

19. CHATEAU-ROUX, in the department of Indre, and ci-devant province of Berry. It has a cloth manufacture, and is ſeated in a very large pleaſant plain on the Indre, 15 miles SW. of Iſſondun, and 148 S. of Paris. Lon. 1. 51. E. Lat. 46. 48. N.

20. CHATEAU-THIERRY, in the dep. of Aiſne, and late province of Champagne. It was the birth place of the celebrated Fontaine. Its caſtle is ſeated on an eminence, on the river Maine, 27 miles SW. of Rheims, and 97 NW. of Paris. Lon. 3. 33. E. Lat. 49. 2. N.

21. CHATEAU-VILAIN, in the department of Yonne, and ci-devant province of Champagne, with a caſtle, ſeated on the river. Lon. 2. 59. E. Lat. 48. 0. N.

(1.) CHATEL, Francis du, an eminent painter of Bruſſels, in the middle of the 16th century. The moſt capital picture by this maſter is one in the town-hall at Ghent, repreſenting the king of Spain receiving the oath of fidelity from the ſtates of Flanders and Brabant.

(2.) **Chatel**, Peter du, in Latin *Caſtellanus*, a learned French divine, born at Arc, and educated at Dijon. He aſſiſted Eraſmus in his tranſlations from the Greek, and became corrector of the preſs in Frobenius's office at Baſil. After travelling into various countries and as far as Egypt and Paleſtine, he returned to his native country, where he became reader to Francis I. who gave him firſt the biſhopric of Tulle, and afterwards that of Maçon. Henry II. tranſlated him to Orleans, where he died in 1552. He was not only a man of univerſal learning, but of great eloquence, and a ſtrenuous defender of the liberties of the Gallican church. He wrote two funeral orations for Francis, and a Latin letter for that king againſt the emperor Charles V.

(3.) **Chatel**, Tanneguy du, a celebrated French general, was born of a good family in Brittany. He diſtinguiſhed himſelf early by an expedition againſt England, where he gained conſiderable booty. In 1410 he defeated Ladiſlaus the uſurper of the two Sicilies, and in 1414 was made marſhal of Guienne. He was at the battle of Agincourt, and when Paris was ſurpriſed by the Burgundian faction, he had the addreſs to ſave the dauphin, and afterwards effected a peace between the two princes. But he blaſted his laurels by adviſing the dauphin to aſſaſſinate the duke of Burgundy in 1419. When the dauphin aſcended the throne, he appointed du Chatel grand maſter of his houſehold; and afterwards employed him in ſeveral honourable miſſions. He died in 1449.—His nephew of the ſame name diſtinguiſhed himſelf by his fidelity to the unfortunate Charles VII. whom he attended in his latter moments, and interred at his own private expence.

(4.) **Chatel**, or **Chate**, a town of Franee in the department of Voſges, and late province of Lorrain, ſeated on the Moſelle, 8 miles from Mirecourt.

Chatel-Aillon, a maritime town of France, in the department of Lower Charente, and ci-devant province of Saintonge, 5 miles from Rochelle.

Chatel-Chalon, a town of France, in the department of Jura, and late province of Franche Comte, remarkable for its ci-devant Benedictine abbey. It is 20 miles S. of Dole. Lon. 5. 38. E. Lat. 46. 46. N.

(1.) CHATELET, a town of France, in the new department of Sambre and Meuſe, and ci-devant Auſtrian Netherlands, ſeated on the Sambre. Lon. 4. 28. E. Lat. 50. 25. N.

(2.) **Chatelet**, the name of certain ci-devant courts of juſtice in France, under the old government. The grand chatelet at Paris, was the place where the preſidial or ordinary court of juſtice of the provoſt of Paris was held; and conſiſted of preſidial, a civil chamber, a criminal chamber, and a chamber of policy. The little chatelet is an old fort.

* CHATELLANY. *n. ſ.* [*chatelenie*, Fr.] The diſtrict under the dominion of a caſtle.—Here are about 20 towns and forts of great importance, with their *chatellanies* and dependencies. *Dryden.*

CHATEL-LE-CHATEL, a town of France, in the department of Allier, the ci-devant Bourbonnois.

CHATELLERAULT, a town of France, in the department of Vienne, and late province of Poitou; ſeated in a fertile and pleaſant country, on the river Vienne, over which is a handſome ſtone bridge. It is noted for its cutlery, watch-making, and the cutting of falſe diamonds. It is 22 miles NE. of Poitiers, and 168 SW. of Paris. Lon. 0. 40. E. Lat. 46. 34. N.

CHATFORD, a town 4 miles S. of Shrewſbury.

(1.) CHATHAM, a town of Kent, adjoining to Rocheſter, ſeated on the Medway. It is the principal ſtation of the royal navy; the yards and magazines, of which there are whole ſtreets, are furniſhed with all kinds of naval ſtores, and materials for building and rigging the largeſt men of war. The entrance into the Medway, is defended by Sheerneſs and other forts; notwithſtanding which, the Dutch burnt ſeveral ſhips of war here in the reign of Charles II. after the peace of Breda had been agreed upon. In 1757, by direction of William, D. of Cumberland, ſeveral additional fortifications were begun at Chatham; ſo that now the ſhips are in no danger of inſult either by land or water. It has a market on Sat. a church, or chapel of eaſe, and a ſhip uſed as a church for the ſailors. It conſiſts of about 1800 houſes, moſtly low, and built with brick; the ſtreets are narrow, and paved; and it contains about 10,000 inhabitants. The principal employment is ſhip-building in the king's yard and private docks. The largeſt veſſels and fleets are fitted out with aſtoniſhing expedition. Chatham is 31 miles ESE. of London. Lat. 0. 36. E. Lat. 51. 22. N.

(2.) **Chatham**, a town of Maſſachuſetts, with a harbour, ſeated on the E. ſide of Barnſtable county; 19 miles E. of Barnſtable and 96 SW. of Boſton. Lon. from Philadelphia, 4. 57. E. Lat. 41. 41. N.

(3.) **Chatham**, a town of South Carolina, in Cheſterfield county, and Cheraws diſtrict, ſeated on the W. ſide of the Great Pedee; 15 miles N. by E. of Greenſville, 150 of Charleſton, and 776 of Philadelphia: from which it lies in Lon. 5. 50. W. Lat. 34. 44. N.

(4.) **Chatham**, a well cultivated county of North Carolina, in Hillſborough diſtrict, bounded on the W. by Randolph, N. by Orange, E. by Wake, and S. by Cumberland and Moore counties. In 1795, it contained 7589 free inhabitants, and 1632 ſlaves. It is watered by the NW. branch of Cape Fear river. It abounds in iron ore, which is manufactured into iron at Fiſh-creek. The chief town is Pittſburg.

(5.) **Chatham**, a flouriſhing townſhip of Connecticut, in Middleſex county.

(6.) **Chatham**, a county of Georgia, containing 2568 citizens, and 8201 ſlaves. Savannah is the chief town.

(7.) **Chatham**, a town of New Hampſhire, in Grafton county.

(8.) **Chatham**, a townſhip of New Jerſey, in Eſſex county, 15 miles W. of Elizabeth Town.

(9.) **Chatham**, a townſhip of New York, in Columbia county.

(10.) Chatham, Earl of. See Pitt.

CHATHERSTON, a ſmall town in Dorſetſh. between Lyme, and Bridport.

CHATIGAN, a town of Aſia, in Bengal, ſubject to the Great Mogul. It is but a poor place, though it was the firſt the Portugueſe ſettled at in theſe parts, and who ſtill keep a ſort of poſſeſſion. It has a few cotton manufactures, but affords the beſt timber for building. The inhabitants are ſo ſuſpicious of each other, that they always go armed with a ſword, piſtol, and blunderbuſs, not excepting the prieſts. It is ſeated on the E. branch of the Ganges. Lon. 91. 10. E. Lat. 23. 0. N.

CHATILLON, the name of 5 towns in France, diſtinguiſhed as follows:—

1. Chatillon les Dombes, in the department of Ain, the ci-devant province of Breſſe. It is 12 miles W. of Bourg, and 16 miles SW. of Geneva. Lon. 5. 40. E. Lat. 46. 16. N.

2. Chatillon sur Indre, in the department of Indre, and late province of Berry; ſeated on the Indre, 10 miles S. of Loches. Lon. 0. 55. E. Lat. 47. 22. N.

3. Chatillon sur Loire, in the department of Loiret, and ci-devant province of Gatinois.

4. Chatillon sur Marne, in the department of Marne, and ci-devant province of Champagne; 17 miles S. of Rheims. Lon. 4. 5. E. Lat. 48. 58. N.

5. Chatillon sur Seine, in the department of Cote d'Or, and ci-devant province of Burgundy, divided into two by the Seine. It is 32 miles from Langres, and 36 NW. from Dijon; and has iron works in its neighbourhood. Lon. 4. 35. E. Lat. 47. 42. N.

CHATLEY, a town in Eſſex, NW. of Witham.

CHATMORE, a village near Buckingham.

CHATMOSS, in Lancaſhire, W. of Irwell.

CHATOQUE, or Chautaughque, a lake of the United States, in New York; the NW. end of which is 9 miles from lake Erie; and the lower end lies in Lat. 42. 10. N.

CHATER, a town of France, in the department of Indre, and late province of Berry, ſeated on the Indre, 37 miles from Bourges, and 4 E. of Charleroy. It carries on a conſiderable trade in cattle. Lon. 1. 55. E. Lat. 46. 35. N.

CHATSHAM, a town SW. of Ipſwich, Suffolk.

(1.) * CHATTEL. *n. ſ.* [See Cattle.] Any moveable poſſeſſion: a term now ſcarce uſed but in forms of law.—

Nay, look not big, nor ſtamp, nor ſtare, nor fret;
I will be maſter of what is mine own;
She is my goods, my *chattels*. *Shakeſpeare.*

(2.) Chattels, in the modern ſenſe of the word, are all ſorts of goods, moveable or immoveable, except ſuch as are in the nature of freehold.

* CHATTER. *n. ſ.* [from the verb.] 1. Noiſe like that of a pie or monkey.—

The mimic ape began his *chatter*,
How evil tongues his life beſpatter. *Swift.*

2. Idle prate.

* *To* Chatter. *v. n.* [*chaqueter*, Fr.] 1. To make a noiſe as a pie, or other unharmonious bird.—Nightingales ſeldom ſing, the pie ſtill *chattereth*. 2. To make a noiſe by colliſion of the teeth.—

Dip but your toes in cold water,
Their correſpondent teeth will *chatter*. *Prior.*

3. To talk idly or careleſsly:—Suffer no hour to paſs away in a lazy idleneſs, an impertinent *chattering*, or uſeleſs trifles. *Watt's Logick.*

(1.) * CHATTERER. *n. ſ.* [from *chatter*.] An idle talker; a prattler.

(2.) Chatterer, in ornithology. See Ampelis.

CHATTERIS, a village in Cambridgeſhire, near Garter's Bridge, in the Fens.

CHATTERPOUR, a town of Hindooſtan, the capital of Bundelcund. Lat. 25. 0. N.

(1.) CHATTERTON, near Rochdale, Lancaſhire.

(2.) Chatterton, Thomas, an unfortunate poet, whoſe fate and performances excited in no ſmall degree the public attention, as well as gave riſe to much literary controverſy. He was born at Briſtol, Nov. 20, 1752; and educated at a charity ſchool on St Auguſtin's Back, where nothing more was taught than reading, writing, and accounts. At 14 years of age, he was articled clerk to an attorney at Briſtol, with whom he continued about three years. Though his education was thus confined, he diſcovered an early turn for poetry, Engliſh antiquities, and heraldry. How ſoon he began to be author is not known. In the Town and Country Magazine for March 1769, are two letters, dated from Briſtol, and ſubſcribed with his uſual ſignature, D. B. *i. e. Dunhelmus Briſtolienſis*. The former contains ſhort extracts from two MSS. "written 300 years ago by one Rowley a monk," concerning dreſs in the age of Henry II.; the latter, "Ethelgar, a Saxon poem," in bombaſt proſe. In the ſame magazine for May 1769, are three communications from Briſtol, ſigned D. B one intitled "Obſervations upon Saxon Heraldry, with drawings of Saxon Atchievements;" and in the ſubſequent magazines for 1769 and 1770, there are ſeveral other pieces, which are undoubtedly of his compoſition. In April 1770, he left Briſtol, diſguſted with his profeſſion, and came to London in hopes of advancing his fortune by his pen. Things ſoon brightened up with him; for on May 14, he wrote to his mother, in high ſpirits, upon the change of his ſituation, with the following ſarcaſtic reflection upon his former patrons at Briſtol: "As to ——, &c. &c. they rate literary lumber ſo low, that I believe an author, in their eſtimation, muſt be poor indeed; but here matters are otherwiſe. Had Rowley been a Londoner inſtead of a Briſtowyan, I could have lived by copying his works." In a letter to his ſiſter, May 30, he informs her that he is to be employed in writing a voluminous Hiſtory of London, to appear in numbers the beginning of next winter. Meantime, he had written ſomething in praiſe of Beckford, then lord mayor, which had procured him the honour of being preſented to his lordſhip; and, he gives the following account of his reception, with his obſervations upon political writing: "The lord mayor received me as politely as a citizen could; but the devil of the matter is, there is no money to be got on this ſide of the queſtion. However, he is a poor author who cannot write on both ſides. Eſſays on the patriotic ſide will fetch no more than what the copy is ſold for. As the patriots themſelves are ſearching for places, they have no gratuity to ſpare. On the other hand, unpopular eſſays will not even be accepted, and you muſt pay to have them printed; but then you ſeldom loſe by it, as courtiers are ſo ſenſible of their deficiency in merit, that they generouſly reward all who know how to daub them with the appearance of it." He continued to write inceſſantly in various periodical publications. July 12th, he tells his ſiſter that he had pieces laſt month in the Goſpel Magazine, the Town and Country, the Court and City, the London Political Regiſter, &c. But all theſe exertions of his genius brought in ſo little profit, that he was ſoon reduced to the extremeſt indigence; ſo that at laſt, oppreſſed with poverty and diſeaſe, in a fit of deſpair he put an end to his exiſtence, Aug. 1770, with a doſe of poiſon. This unfortunate perſon, though certainly a moſt extraordinary genius, ſeems yet to have been of a moſt ungracious compoſition. He was violent and impetuous to a ſtrange degree. From the firſt of the above cited letters he ſeems to have had a portion of ill humour and ſpleen more than enough for a lad of 17; and the editor of his Miſcellanies records, "that he poſſeſſed all the vices and irregularities of youth, and that his profligacy was at leaſt as conſpicuous as his abilities." In 1777, were publiſhed in one volume 8vo, "Poems ſuppoſed to have been written at Briſtol, by Thomas Rowley and others, in the 15th century; the greateſt part now firſt publiſhed from the moſt authentic copies, with an engraved ſpecimen of one of the MSS. To which are added, a Preface, an introductory Account of the ſeveral Pieces, and a Gloſſary." And, in 1778, were publiſhed in one volume 8vo, "Miſcellanies in Proſe and Verſe, by Thomas Chatterton, the ſuppoſed author of the Poems publiſhed under the names of Rowley, &c." Theſe poems have made no ſmall noiſe in the literary world. Dr Watkins, in his memoir of Chatterton, ſays, "What has given celebrity to his name, is the real or pretended diſcovery of poems, written in the 15th century, by Thomas Rowley, a prieſt of Briſtol, and others, in Radcliffe church, of which Chatterton's anceſtors had been ſextons near a century and a half. His father certainly remov'd a number of parchments from an old cheſt in that church, moſt of which were uſed in covering books. Young Chatterton, from the peruſal of ſome of them, is ſuppoſed to have formed the deſign of a literary forgery. In 1768, appeared in Briſtol newſpaper, an article entitled, *Deſcription of the Friars firſt paſſing over the old bridge, taken from an ancient manuſcript.* This attracted the notice of Mr Barret, who was engaged in writing the hiſtory of Briſtol; and he obtained from Chatterton ſeveral pieces in proſe and verſe, purporting to be written by Canynge, founder of Radcliffe church, and Thomas Rowley. The year following he began a correſpondence with Mr Horace Walpole, well known as an antiquary and a connoiſſeur; but on his communicating the papers to his friends Maſon and Gray, theſe acute judges pronounced them forgeries. Chatterton had formed great expectations from the patronage of Mr Walpole, but finding himſelf neglected, he wrote him a very impertinent letter, and their intercourſe ended. Rowley's Poems were firſt collected by Mr Tyrwhit, in one volume 8vo, and afterwards in one volume 4to by Dean Miller, but the former gentleman gave up the queſtion of their genuineneſs. A ſharp controverſy was carried on for ſome time on the point, between Mr Warton, Mr Bryant, Mr Matthias, and others; but the poems are now generally conſidered as Chatterton's own productions. A new edition of his works was recently publiſhed in 3 vols. 8vo." *Biog. Dict.* 1806.

CHATTERSWORTH, a villa in the Peak of Derby, and reckoned one of its wonders. It is a moſt magnificent houſe, and belongs to the duke of Devonſhire. It is ſeated on the Derwent, and built of ſtone dug on the ſpot; and lies 6 miles from Cheſterfield, and 141 from London. It was here that Mary queen of Scots was impriſoned 17 years; in memory of which the new lodgings that are built in place of the old, is called the Queen of Scots Apartments.

CHATTON, a town in the county of Northumberland, E. of Wooller.

(1.) CHATWELL, a village SW. of Acton-Burnel, Salop.

(2.) CHATWELL MAGNA, } in Staffordſhire,
(3.) CHATWELL PARVA, } near Shropſhire.

* CHATWOOD. *n. ſ.* Little ſticks; fuel.

CHAVARIGHIS, or } a ſect of Mahometans,
CHAVARITES, } who deny that God ever ſent a prophet that was infallible, with a commiſſion to give a law to mankind. They ſay, that if ſuch an office were neceſſary, it would not be confined to a ſingle family, but that every man of probity and virtue would be capable of that honour.

CHAUCER, Sir Geofrey, an eminent Engliſh poet in the 14th century, born at London in 1328. After he left the univerſity he travelled into Holland, France, and other countries. Upon his return he entered himſelf in the Inner Temple, where he ſtudied the municipal laws of England. His firſt ſtation at court was page to Edward III. from whom he had a penſion. Soon after he was made gentleman of the king's privy chamber, and ſhield-bearer to the king. He ſpent his younger days in a conſtant attendance at court, or for the moſt part living near it, in a ſquare ſtone houſe near the park gate at Woodſtock, ſtill called *Chaucer's Houſe.* Patroniſed by the duke of Lancaſter, he was ſent, in 1373, to the republic of Genoa to hire ſhips for the king's navy; and the king was ſo well ſatisfied with his negociation, that, on his return, he obtained a grant of a pitcher of wine daily in the port of London, to be delivered by the butler of England; and ſoon after was made comptroller of the cuſtoms for wool, wool-fells, and hides; an office which he diſcharged with great diligence and integrity. At this period, his income was about 1000 l. a year; a ſum which in thoſe days might well enable him to live, as he ſays he did, with dignity in office, and hoſpitality among his friends. It was in this meridian blaze of proſperity, that he wrote his moſt humorous poems. His ſatires againſt the prieſts were probably written to oblige his patron the duke of Lancaſter, who favoured the cauſe of Wickliff, and endeavoured to expoſe the clergy to the inſignation of the people. In the laſt year of Edward III. our poet was employed in a commiſſion to treat with the French; and in the beginning of king Richard's reign, he was in ſome degree of favour at court. But the duke's intereſt failing, that of Chaucer entirely ſunk; and the former paſſing over ſea, his friends felt all the malice of the oppoſite party. Theſe misfortunes occaſioned his writing that excellent treatiſe *The Teſtament of Love*, an imitation of Boethius on the conſolation of philoſophy. Being much reduced, he retired to Woodſtock, to comfort himſelf with ſtudy, which produced his admirable treatiſe of the *Aſtrolabe*. The duke of Lancaſter at laſt ſurmounting his troubles, married Lady Catharine Swynford, ſiſter to Chaucer's wife; ſo that Thomas Chaucer, our poet's ſon, became allied to moſt of the nobility, and to ſeveral of the kings of England. By the influeuce of the duke's marriage, he again obtained a conſiderable ſhare of wealth. But being now 70, he returned to Dunnington Caſtle near Newbury. He had not enjoyed this retirement long before Henry IV. ſon of the duke of Lancaſter, aſſumed the crown, and in the firſt year of his reign gave our poet marks of his favour. But the grants of the late king being annulled, Chaucer, to procure freſh grants of his penſions, left his retirement, and applied to court: where, though he obtained a confirmation of ſome grants, yet the fatigue of attendance, and his great age, prevented him from enjoying them. He fell ſick at London, and ended his days in the 72d year of his age, leaving the world as though he deſpiſed it, as appears from his ſong of *Flie from the Preſſe*. He was interred in Weſtminſter abbey; and in 1556, Mr Nicholas Bingham, a gentleman of Oxford, at his own charge, erected a handſome monument for him there. Caxton firſt printed the Canterbury Tales; but his works were firſt collected and publiſhed in one volume folio by William Thynne, London, in 1542. They were afterwards reprinted in 1561, 1598, 1602; and at Oxford in 1721. Chaucer was not only the firſt poet, but one of the beſt, which theſe kingdoms ever produced. He was equally great in every ſpecies of poetry which he attempted; and his poems in general poſſeſs every kind of excellence, even to a modern reader, except melody and accuracy of meaſure; defects which are to be attributed to the imperfect ſtate of our language, and the infancy of the art in this kingdom at the time when he wrote. "As he is the father of Engliſh poetry (ſays Mr Dryden), ſo I hold him in the ſame degree of veneration as the Grecians held Homer, or the Romans Virgil. He is a perpetual fountain of good ſenſe, learned in all ſciences, and therefore ſpeaks properly on all ſubjects. As he knew what to ſay, ſo he knows alſo when to leave off; a continence which is practiſed by few writers, and ſcarcely by any of the ancients, except Virgil and Horace." This character Chaucer certainly deſerved. He had read a great deal; and was a man of the world, and of ſound judgment. He was the firſt Engliſh poet who wrote *poetically*, as Dr Johnſon obſerves in the preface to his Dictionary. He had alſo the merit of improving our language conſiderably, by the introduction and naturalization of words from the Provençal, at that time the moſt poliſhed dialect in Europe.

CHAUCI, an ancient people of Germany, who inhabited CHAUCIS. They were divided into

1. CHAUCI MAJORES, the ancient inhabitants of the territory now called BREMEN, and part of LUNENBURG: and

2. CHAUCI MINORES, the ancient inhabitants of EAST FRIESLAND, and OLDENBURG.

CHAUD-MEDLEY, in law, is of much the ſame import with CHANCE-MEDLEY. The former in etymology ſignifies an affray in the heat of blood or paſſion; the latter, a caſual affray. The latter is in common ſpeech too often erroneouſly applied to any manner of homicide by miſadventure; whereas it appears by the ſtat. 24. Hen. VIII. c. 5. and ancient books (*Staundf.* P. C. 16.), that it is properly applied to ſuch killing as happens in ſelf-defence upon ſudden encounter.

* CHAUDRON. See CHALDER.

* CHAVENDER. [*Cheveſne*, Fr.] The chub; a fiſh.—Theſe are a choice bait for the chub, or *chavender*, or indeed any great fiſh. *Walton.*

CHAVES, or } a town of Portugal, in the pro-
CHAVEZ, } vince of Tra-los-Montes, ſeated on the Tamega, at the foot of a mountain; ſaid to have been built by Veſpaſian. It has two forts and two ſuburbs. Between the town and the ſuburb Magdalena, is an old Roman ſtone bridge 92 geometrical paces long, and 3 broad. It is 30 miles SW. of Braganza. Lon. 7. 0. W. Lat. 41. 45. N.

CHAUL, a town of the Eaſt Indies, on the coaſt of Malabar, in the province of Blagana, and kingdom of Viſapour. Its river affords a good harbour for ſmall veſſels. The town and the iſland on the S. ſide of the harbour are fortified. It had formerly a good trade, but is now miſerably poor. It was taken by the Portugueſe in 1507, to whom it ſtill belongs. It is 15 miles S. of Bombay, and 5 miles from the ſea. Lon. 72. 45. E. Lat. 18. 30. N.

CHAULEY, a village in Devonſhire, 10 miles from Crediton, and 18 from Exeter. It has fairs May 6, and Dec. 11.

CHAULIEU, Wm. Amfrye DE, abbé d'Amale, one of the moſt polite and ingenious of the French poets, was born in 1639, and died at the age of 84. The moſt complete edition of his poems is that printed in 2 vols 8vo, in 1733.

CHAULNE, or CHAUNE, a town of France, in the department of Somme, and ci-devant province of Picardy. Lon. 2. 55. E. Lat. 49. 45. N.

CHAULTON, two villages; 1. in Bedfordſh. SE. of Tuddington; 2. in Shropſhire, E. of Colbatch.

(1.) CHAUMONT, a town of France, in the department of Oiſe and ci-devant province of the Iſle of France, 30 miles NW. of Paris. Lon. 2. 7. E. Lat. 49 48. N.

(2.) CHAUMONT, a town of France, in the department of Upper Marne, and ci-devant province of Champagne. It is ſeated on a mountain near the river Marne, 45 miles E. of Troyes, and 14 S. of Joinville. Lon. 5. 9. E. Lat. 48. 8. N.

* CHAUMONTELLE. *n. ſ.* [French.] A ſort of pear.

CHAUNDON-WICK, a village in Wiltſhire, SW. of Saliſbury Plain.

CHAUNSTON, a village in the Golden Vale, Herefordſhire.

CHAUNTON, W. of Haylſham, Suſſex.

CHAUNTRY. See CHANTRY.

CHAUNY, a town of France, in the department of Aiſne, and ci-devant province of Picardy; ſeated on the Oiſe, 20 m. E. of Noyon. Lon. 3. 18. E. Lat. 49. 17. N.

CHAUS, a province of Fez, in Barbary.

(1.) CHAUVIN. See CALVIN.

(2.) CHAUVIN, Stephen, a celebrated proteſtant miniſter, born at Niſmes. He left France upon the revocation of the edict of Nantz, and retired to Rotterdam, where he began a new *Journal des Scavans;* and afterwards removing to Berlin, continued it there 3 years. He was made profeſſor of philoſophy at Berlin, and diſcharged that office with much honour and reputation. His principal work is a *Philoſophical Dictionary*, in Latin, which he publiſhed at Rotterdam in 1692; and gave a new edition of it much augmented, at Lewarden, in 1713, folio. He died in 1735, aged 85.

CHAUX-DE-FOUD, a village of Switzerland, in the principality of Neufchatel, capital of a valley of the ſame name, which has excellent paſtures and numerous flocks of cattle. The inhabitants, about 3000, are famed as clock and watch makers; and the women are employed in the lace manufacture. It is 9 miles NNW. of Neufchatel.

* CHAW. *n. ſ.* [from the verb.] The chap; the upper or under part of a beaſt's mouth.—I will turn thee back, and put hooks into thy *chaws*, and will bring thee forth and all thine army. *Ezekiel.*

* *To* CHAW. *v. a.* [*kawen*, Germ.] To champ between the teeth; to maſticate; to chew.—

They come to us, but us love draws;
He ſwallows us, and never *chaws;*
He is the tyrant pike, and we the fry. *Donne.*
The man who laught but once, to ſee an aſs
Mumbling to make the croſs-grain'd thiſtles paſs,
Might laugh again, to ſee a jury *chaw*
The prickles of unpalatable law. *Dryden.*

* CHAWDRON. *n. ſ.* Entrails.—

Add thereto a tyger's *chawdron*,
For the ingredients of our cauldron. *Shakeſp.*

CHAWERTON, a town S. of Mancheſter.

(1.) CHAWLEY, S. of Wallingford, Berks.

(2.) CHAWLEY, SE. of Chimleigh, Devonſhire.

CHAWORTH, near W. Retford, Nottinghamſ.

CHAWRITH, near Broxted, Eſſex.

CHAWTON, in Hampſhire, near Alton.

CHAYANTA, a diſtrict of Peru, famous for gold and ſilver mines.

CHAYE, a Perſian coin, ¼ of an ABASSI.

CHAYLEY, a town 7 m. from Lewis, Suſſex.

CHAYOTI. See CHAJOTLI.

CHAYQUARONA, in ichthyology, a ſpecies of TURDUS, caught on the coaſt of Braſil.

CHAZELLES, John Matthew, a celebrated French mathematician and engineer, born at Lyons in 1657. M. du Hamel, finding his genius inclined to aſtronomy, introduced him to M. Caſſini, who employed him in his obſervatory. Having, in 1684, inſtructed the duke of Mortemar in mathematics; he procured him the profeſſorſhip of hydrography, for the galleys of Marſeilles. In 1686, the galleys made 4 courſes, merely for exerciſe. Chazelles went on board every time with them; kept his ſchool upon the ſea, and ſhowed the practice of what he taught. In 1687 and 1688, he drew many plans of ports, roads, towns, and forts, which were lodged with the miniſters of ſtate. At the beginning of the war, which ended with the peace of Ryſwick, Chazelles was ſent to make the experiment, whether the gallies might not ſerve to tow the men of war when the wind ſailed or proved contrary, and help to ſecure the coaſt of France upon the ocean. Accordingly, in 1690, 15 galleys new built ſet ſail for Rochefort, cruiſed as far as Torbay, and proved uſeful at the deſcent upon Tinmouth. After this, he digeſted into order the obſervations he had made on the coaſts of the ocean; and drew diſtinct maps, with a portulans to them. Theſe maps were inſerted in the *Neptune Francoiſe*, publiſhed in 1692, when Chazelles was engineer at the deſcent at Oneille. To make obſervations in geography and aſtronomy, he undertook a voyage to the Levant in 1693; and among other things he meaſured the pyramids of Egypt, and found the 4 ſides of the largeſt of them exactly to face the 4 cardinal points of the compaſs. He made a report of his voyage, on his return, to the Academy of Sciences, upon which he was named a member in 1695, and had many papers inſerted in their Memoirs, from 1693 to 1708. He died at Marſeilles, 16th Jan. 1710.

CHAZINZARIANS, [from *chazus*, Armen. a croſs,] a ſect of heretics who roſe in Armenia in the 7th century. They are alſo called STAUROLATRÆ, which, in Greek, ſignifies the ſame as *Chazinzarians* in Armenian, *viz. adorers of the croſs;* they being charged with paying adoration to the croſs alone. In other reſpects, they were Neſtorians; and admitted two perſons in Jeſus Chriſt. Nicephorus aſcribes other ſingularities to them; particularly their holding an annual feaſt in memory of *Artzibartzes*, the dog of their falſe prophet Sergius.

(1.) CHEADLE, a town in Staffordſhire, ſeated near the ſource of Dove, in the moſt fertile part of the moor lands, 12 m. NE. of Stafford. Lon. 1. 56. W. Lat. 53. 0. N.

(2.) CHEADLE, W. of Stockport, Cheſhire.

CHEAM, a village near Ewel, Surry, 13 m. S. by W. of London.

(1.) * CHEAP. *adj.* [*ceapan*, Sax. *koopen*, Dutch, to buy.] 1. To be had at a low rate; purchaſed for a ſmall price.—Where there are a great many ſellers to a few buyers, there the thing to be ſold will be *cheap*. On the other ſide, raiſe up a great many buyers for a few ſellers, and the ſame thing will immediately turn dear. *Locke.* 2. Of ſmall value; eaſy to be had; not reſpected.—The goodneſs, that is *cheap* in beauty, makes beauty brief in goodneſs. *Shakeſpeare.*—

Had I ſo laviſh of my preſence been,
So common hackney'd in the eyes of men,
So ſtale and *cheap* to vulgar company. *Shakeſp.*

(2.) * CHEAP. *n. ſ.* [*cheping* is an old word for *market;* whence *Eaſt-cheap*, *Cheapſide*.] Market; purchaſe; bargain; as good *cheap;* [*a bon marche*, Fr.]

Fr.] The ſame wine which we pay ſo dear for now-a-days, in that good world was very good *cheap*. *Sidney*.—It is many a man's caſe to tire himſelf out with hunting after that abroad, which he carries about him all the while, and may have it better *cheap* at home. *L'Eſtrange*.—Some few inſulting cowards, who love to vapour good *cheap*, may trample on thoſe who give leaſt reſiſtance. *Decay of Piety*.

* *To* CHEAPEN. *v. a.* [*ceapan*, Sax. to buy.] 1. To attempt to purchaſe; to bid for any thing; to aſk the price of any commodity.—Rich ſhe ſhall be, that's certain; wiſe, or I'll none; virtuous, or I'll never *cheapen* her. *Shakeſpeare*.—The firſt he *cheapened* was a Jupiter, which would have come at a very eaſy rate. *L'Eſtrange*.—

She ſlipt ſometimes to Mrs Thody's,
To *cheapen* tea. *Prior*.
To ſhops in crouds the daggled females fly,
Pretend to *cheapen* goods, but nothing buy. *Swift*.

2. To leſſen value.—

My hopes purſue a brighter diadem,
Can any brighter than the Roman be?
I find my proffer'd love has *cheapen'd* me. *Dryd*.

* CHEAPLY. *adv.* [from *cheap*.] At a ſmall price; at a low rate.—

By theſe I ſee
So great a day as this is *cheaply* bought. *Shakeſ*.
Blood, rapines, maſſacres, were *cheaply* bought,
So mighty recompence your beauty brought. *Dryden*.

* CHEAPNESS. *n. ſ.* [from *cheap*.] Lowneſs of price.—Ancient ſtatutes incite merchant-ſtrangers to bring in commodities; having for end *cheapneſs*. *Bacon*.—The diſcredit which is grown upon Ireland, has been the great diſcouragement to other nations to tranſplant themſelves hither, and prevailed farther than all the invitations which the *cheapneſs* and plenty of the country has made them. *Temple*.

* CHEAR. See CHEER.

CHEARDESLY, [*Cerdicſlega*, Saxon, *i. e.* the ſlaughter of Cerdic,] a town in Buckinghamſhire, ſo called from a fight between king Cerdic, the Saxon, and the Britons. *Bailey*.

(1.) CHEAT, a river of Virginia, which riſes in Randolph county on the NW. ſide of the Allegany mountains; thence running NNW. it paſſes into Pennſylvania, and unites with the Monongahela, nearly 4 miles N. of the diviſional line of Virginia; 102 above Pittſburg, and 40 above Brownſville. It is 200 yards broad at the mouth; and, except in dry ſeaſons, is navigable for boats 50 miles higher, up to the Dunkard's ſettlement, where it is 100 yards broad; and opens a comminucation with the Potomac, at the mouth of Savage river, by a portage of 37 miles.

(2.) * CHEAT. *n. ſ.* [from the verb. Some think abbreviated from *eſcheat*, becauſe many fradulent meaſures being taken by the lords of manours in procuring eſcheats, *cheat* the abridgement was brought to convey a bad meaning.] 1. A fraud; a trick; an impoſture.—The pretence of publick good is a *cheat* that will ever paſs, though ſo abuſed by ill men, that I wonder the good do not grow aſhamed to uſe. *Temple*.—

Empirick politicians uſe deceit,
Hide what they give, and cure but by a *cheat*. *Dryden*.
When I conſider life, 'tis all a *cheat*;
Yet, fool'd with hope, men favour the deceit.
Truſt on, and think to morrow will repay;
To-morrow's falſer than the former day;
Lyes worſe; and, while it ſays, we ſhall be bleſt
With ſome new joys, cuts off what we poſſeſt. *Dryden*.

2. A perſon guilty of fraud.—Diſſimulation can be no further uſeful than it is concealed; for as much as no man will truſt a known *cheat*. *South*.—

Like that notorious *cheat*, vaſt ſums I give,
Only that you may keep me while I live. *Dryd*.

(3.) CHEATS, LAWS RESPECTING. If any perſon deceitfully get into his hands or poſſeſſion any money or other things of any other perſon's by any falſe token, &c. being convicted, he ſhall have ſuch puniſhment by impriſonment, ſetting upon the pillory, or by any corporeal pain except death, as ſhall be adjudged by the perſons before whom he ſhall be convicted. As there are ſome frauds which may be relieved civilly, ſo there are others which cannot, but muſt be puniſhed criminally. Thus if a minor, pretending to be of age, defrauds many perſons by taking credit for a conſiderable quantity of goods, and then inſiſting on his nonage, the perſons injured cannot recover the value of their goods, but they may indict and puniſh him for a common cheat. Perſons convicted of obtaining money or goods by falſe pretences, or of ſending threatning letters in order to extort money or goods, may be puniſhed with fine or impriſonment, or by pillory, whipping, or tranſportation.

* *To* CHEAT. *v. a.* [of uncertain derivation; probably from *acheter*, Fr. to purchaſe, alluding to the tricks uſed in making bargains. See the noun.] 1. To defraud; to impoſe upon; to trick. It is uſed commonly of low cunning.—It is a dangerous commerce, where an honeſt man is ſure at firſt of being *cheated*; and he recovers not his loſſes, but by learning to *cheat* others. *Dryden*.—There are people who find that the moſt effectual way to *cheat* the people, is always to pretend to infallible cures. *Tillotſon*. 2. It has *of* before the thing taken away by fraud.—

I that am curtail'd by this fair proportion,
Cheated of feature by diſſembling nature,
Deform'd, unfiniſh'd. *Shakeſpeare*.

* CHEATER. *n. ſ.* [from *cheat*.] One that practiſes fraud.—I will be *cheater* to them both, and they ſhall be exchequers to me. [It is here for *eſcheater*.] *Shakeſpeare*.

They ſay this town is full of couzenage,
As nimble jugglers that deceive the eye;
Diſguiſed *cheaters*, prating mountebanks,
And many ſuch like libertines of ſin. *Shakeſp*.

—He is no ſwaggerer, hoſteſs; a tame *cheater* i' faith.——*Cheater*, call you him? I will bar no honeſt man my houſe nor no *cheater*. *Shakeſp*.—All ſorts of injurious perſons, the ſacrilegious, the detainers of tithes, *cheaters* of men's inheritances, falſe witneſſes and accuſers. *Taylor's Living Holy*.

CHEATHINGQUAMINS, an Indian fruit reſembling a cheſnut. *Bailey*.

CHEBAR, a river of Chaldea, where the prophet Ezekiel ſaw ſeveral of his viſions. It is thought to have been cut between the Euphrates and the Tigris. Others ſay it had its riſe near the head of the Tigris, and running SW. through Meſopotamia, fell into the Euphrates, a little S. of Carchemiſh.

CHEBRECHIN, a town of Poland, in the province of Red Ruſſia and palatinate of Belſkow; which carries on a great trade in wax. It is ſeated on the declivity of a hill, and the river Wierpi waters its walls. The Jews there are very rich. Lon. 23. 51. E. Lat. 50. 35. N.

CHEBRIESSA, a village of Egypt, between Rhamania and Cairo, rendered famous by a battle fought near it, July 13, 1798, between Bonaparte and the Mamelukes, where in the latter were defeated and loſt 300 men.

CHEBUKTO, a harbour of North America, in Nova Scotia, near Halifax. Lon. 83. 18. W. Lat. 44. 45. N.

CHECAYA, or PROTOGERO, in Turkiſh affairs, the 2d officer of the Janizaries, who commands under the aga. There is alſo a checaya of the treaſury, ſtables, kitchen, &c. the word ſignifying as much as lieutenant, or the 2d in any office.

CHECHELEY, a village in Buckinghamſhire, near Newport-Pagnel.

(1.) * CHECK. *n.ſ.* [from the verb.] 1. Repreſſure; ſtop; rebuff; ſudden reſtraint.—

Rebellion in this land ſhall loſe his ſway;
Meeting the *check* of ſuch another day. *Shak.*

—We ſee alſo, that kings that have been fortunate conquerors in their firſt years, muſt have ſome *check* or arreſt, in their fortunes. *Bacon's Eſſ.* —God hath of late years manifeſted himſelf in a very dreadful manner, as if it were on purpoſe to give a *check* to this inſolent impiety. *Tillotſon.*—It was this viceroy's zeal, which gave a remarkable *check* to the firſt progreſs of Chriſtianity. *Addiſon's Freeholder.*—God put it into the heart of one of our princes, to give a *check* to that ſacrilege, which had been but too much winked at. *Atterbury.* —The great ſtruggle with paſſions is in the firſt *check*. *Rogers.* 2. Reſtraint; curb; government; continued reſtraint.—They who come to maintain their own breach of faith, the *check* of their conſciences much breaketh their ſpirit. *Hayw.*—The impetuoſity of the new officer's nature needed ſome reſtrain and *check*, for ſome time, to his immoderate pretences and appetite of power. *Claren.*

Some free from ryhme or reaſon, rule or *check*,
Break Priſcian's head, and Pegaſus's neck. *Pope.*

—While ſuch men are in truſt, who have no *check* from within, nor any views but towards their intereſt. *Swift.* 3. A reproof; a ſlight.—

Oh! this life
Is nobler than attending for a *check*. *Shakeſp.*
I do know, the ſtate,
However this may gall him with ſome *check*,
Cannot with ſafety caſt him. *Shakeſpeare.*

4. A diſlike; a ſudden diſguſt; ſomething that ſtops the progreſs.—

Say I ſhould wed her, would not my wiſe ſubjects
Take *check*, and think it ſtrange? perhaps revolt? *Dryden.*

5. In falconry, when a hawk forſakes her proper game to follow rooks, pies, or other birds that croſs her flight. *Chambers.*—A young woman is a hawk upon her wings; and if ſhe be handſome, ſhe is the more ſubject to go out on *check*. *Suckling.*

When whiſtled from the firſt,
Some falcon ſtoops at what her eye deſign'd,
And with her eagerneſs, the quary miſs'd,
Streight flies at *check*, and clips it down the wind.
Dryden.

6. The perſon checking; the cauſe of reſtraint; a ſtop.—He was unhappily too much uſed as a *check* upon the lord Coventry. *Clarendon.* 7. Any ſtop or interruption.—The letters have the natural production by ſeveral *checks* or ſtops, or, as they are uſully called, articulations of the breath or voice. *Holder's Elements of Speech.* 8. The correſpondent cipher of a bank-bill. 9. A term uſed in the game of cheſs, when one party obliges the other either to move or guard his king. 10. *Clerk of the* CHECK, in the king's houſhold, has the check and controulment of the yeomen of the guard, and all the uſhers belonging to the royal family. 11. *Clerk of the* CHECK, in the king's navy at Plymouth, is alſo the name of an officer inveſted with like powers. *Chambers.*

(2.) CHECK, CLERK OF THE, IN THE ROYAL DOCK YARDS, (§ 1. *def.* 11.) an officer who keeps a regiſter of all the men employed aboard his majeſty's ſhips, and of all the artificers and others in the ſervice of the navy at the port where he is ſettled.

(1.) * *To* CHECK. *v. a.* [from the French *echecs*, cheſs; from whence we uſe, at that game, the term *checkmate*, when we ſtop our adverſary from carrying on his play any farther.] 1. To repreſs; to curb.—

Reſerve thy ſtate, with better judgment *check*
This hideous raſhneſs. *Shakeſpeare.*

—Fames may be ſown and raiſed, they may be ſpread and multiplied, they may be *checked* and laid dead. *Bacon.*—

I hate when vice can bolt her arguments,
And virtue has no tongue to *check* her pride.
Milton.

—He who ſat at table, richly and deliciouſly furniſhed, but with a ſword hanging over his head by one ſingle thread or hair, ſurely had enough to *check* his appetite. *South.* 2. To reprove; to chide.

Richard, with his eye brimful of tears;
Then *check'd* and rated by Nothumberland,
Did ſpeak theſe words, now prov'd a prophecy.
Shakeſpeare.

His fault is much, and the good king his maſter
Will *check* him for't. *Shakeſpeare.*

3. To compare a bank note or other bill, with the correſpondent paper. 4. To controul by a counter-reckoning.

(2.) * *To* CHECK. *v. n.* 1. To ſtop; to make a ſtop: with *at*.—With what wing the ſtanyel *checks at* it. *Shakeſpeare.*—

He muſt obſerve their mood on whom he jeſts,
The quality of the perſons, and the time;
And, like the haggard, *check at* every feather
That comes before his eye. *Shakeſpeare.*

—The mind, once jaded by an attempt above its power, either is diſabled for the future, or elſe *checks at* any vigorous undertaking ever after.
Locke.

Locke. 2. To claſh; to interfere.—If love *check* with buſineſs, it troubleth men's fortunes. *Bacon.* 3. To ſtrike with repreſſion.—

I'll avoid his preſence;
It *checks* too ſtrong upon me. *Dryden.*

* CHECKER. CHECKER-WORK. *n. ſ.* Work varied alternately as to its colours or materials.—Nets of *checker-work* and wreaths of chain-work for the chapiters which were upon the top of the pillars. 1 *Kings.*

* *To* CHECKER. *To* CHEQUER. *v. a.* [from *echecs*, cheſs, Fr.] To variegate or diverſify, in the manner of a cheſs-board, with alternate colours, or with darker and brighter parts.—

The grey-ey'd morn ſmiles on the frowning night,
Check'ring the eaſtern clouds with ſtreaks of light. *Shakeſpeare.*
The green leaves quiver with the cooling wind,
And make a *chequer'd* ſhadow on the ground. *Shakeſpeare.*
As the ſnake roll'd in the flow'ry bank,
With ſhining *checker'd* ſlough doth ſting a child,
That for the beauty thinks it excellent. *Shak.*
The wealthy ſpring yet never bore
That ſweet, nor dainty flower,
That damaſk'd not the *checker'd* floor
Of Cynthia's ſummer bower. *Drayton.*
Many a youth and many a maid,
Dancing in the *check'erd* ſhade. *Milton.*

—In the cheſs board the uſe of each cheſs-man is determined only within that *chequered* piece of wood. *Locke.*—In our preſent condition, which is a middle ſtate, our minds are, as it were, *chequered* with truth and falſehood. *Addiſon.*—The ocean intermixing with the land, ſo as to *checker* it into earth and water. *Woodward's Natural Hiſtory.*—

Here waving groves a *checker'd* ſcene diſplay,
And part admit, and part exclude the day. *Pope.*

CHECKEREL, EAST, } two villages, W. of
CHECKEREL, WEST, } Weymouth, Dorſetſh.

* CHECKER-WORK. See CHECKER.

(1.) CHECKLEY, a town W. of Bury, Suffolk.

(2.) CHECKLEY, SE. of Namtwich, Cheſhire.

(3.) CHECKLEY, NW. of Utoxeter, Stafford.

* CHECKMATE. *n. ſ.* [*echec et mat*, Fr.] The movement on the cheſs-board, that kills the oppoſite men, or hinders them from moving.—

Love they him called, that gave me the *checkmate*,
But better might they have behote him hate. *Spenſer.*

* CHECKROLL. *n. ſ.* [from *check* and *roll.*] A roll or book, containing the names of ſuch as are attendants on, and in pay to great perſonages, as their houſhold ſervants. It is otherwiſe called the *chequer-roll*. *Cowel.*—Not daring to extend this law farther than to the king's ſervants in *checkroll*, leſt it ſhould have been too harſh to the gentlemen of the kingdom. *Bacon's Henry* VII.

CHECKY, in heraldry, is when the ſhield, or a bordure, &c. is chequered, or divided into chequers or ſquares, in the manner of a cheſs board. This is one of the moſt noble and ancient figures uſed in armoury; and ought to be given to none but great warriors, in token of their bravery: for the cheſs board repreſents a field of battle; and the pawns placed on both ſides repreſent the ſoldiers of the two armies, which move, attack, advance, or retire, according to the will of the gameſters, who are the generals. This figure is always compoſed of metal and colour. But ſome authors would have it reckoned among the ſeveral ſorts of furs.

CHECOTIMIES, a nation of North American Indians who dwell on the banks of the Sagnenai, in Canada.

CHEDABUCTO, a bay on the E. coaſt of Nova Scotia, which receives Salmon river from the W. remarkable for one of the greateſt fiſheries in the world.

CHEDDER, a town in Somerſetſhire, 3 miles SE. of Axbridge, under the ridge of Mendip hills. It has fairs May 4, and Oct. 29; and is famous for excellent cheeſes. See CHEESE, § 3. Lon. 2. 57. W. Lat. 51. 13. N.

CHEDDER CLIFFS, lie NW. of Axbridge.

CHEDDINGTON, a town near Ayleſbury.

CHEDDISTON, near Haleſworth, Suffolk.

CHEDDON, near Taunt, Somerſetſhire.

CHEDGRAVE, a village in Norfolk, between Yadley and Seching.

CHEDINGTON, N. of Bemiſter, Dorſetſh.

CHEDLETON, S. of Leek, Staffordſhire.

CHEDORLAOMER, king of Elam, the firſt monarch recorded in authentic hiſtory, who made other kings tributaries. His name ſignifies *a generation of bondage*, and about A. M. 2078, he ſubdued the kingdoms of Sodom, Gomorrah, Admah, Zeboim, and Zoar, which after ſerving him twelve years, rebelled. Determined to reduce them, with the aſſiſtance of Amraphel king of Shinar, Arioch king of Ellaſar, and Tidal king of Gojim, or *nations*, he marched againſt them. To deprive them of all poſſible aid, he firſt attacked the neighbouring powers; marching ſouthward on the E. of them, he ſmote the Rephaims, near the ſource of the river Arnon, and pillaged Aſhtaroth-karnaim; he routed the Zuzims at Ham, the Emims in Shaveth-kirjathaim, and the Horites in mount Seir. Having proceeded on the S. ſide till he came to Elparan, he returned, and directed his courſe to the NE. In his way, he ravaged the country of the Amalekites, and ſmote the Amorites who dwelt about Hazazon-tamar. At laſt, he attacked the allied troops of the revolted kingdoms. The field of battle was full of ſlime pits; the army of the revolters was routed; and ſuch as eſcaped the ſlaughter fled to the mountains, poſſibly thoſe on the NE. which afterwards fell to the lot of the Reubenites. Chedorlaomer and his allies, after ravaging the country, and carrying off a number of captives, and a great booty, directed their march northward, intending to return home by the SE. of Syria. But, informed that Lot, his new nephew, and family, were among the captives, Abram, with an handful of ſervants and a few Canaanitiſh allies, purſued the conquerors, overtook them at Dan, and routed them; then purſuing them to Hobah, a little to the N. of Damaſcus, retook their captives and booty. See Gen. xiv. Shuckford ſuppoſes him to have been the ſame with Ninyas king of Aſſyria; but his reaſons are not concluſive.

CHEDSEY, E. of Bridge-water, Somerſetſh.

CHEDUBA, an iſland in the bay of Bengal, on the coaſt of Arracan, 45 miles in length. It yields abundance of rice; and is governed by a lieutenant, who is ſubject to the viceroy of Arracan. The moſt weſtern point is in Lon. 65. 5. E. Lat. 18. 40. N.

(1.) **CHEDWORTH**, a pariſh of England, in Glouceſterſhire, in which a Roman bath was diſcovered in 1760. The Foſſé lies about 2 miles NW. of the village, (N° 2.) There was a tumulus on a hill near the bath, with a very large ſtone ſet upright on it, on the removal of which, great quantities of human bones were diſcovered.

(2.) **CHEDWORTH**, a village in the above pariſh (N° 1.) 4 miles SW. of N. Leach, ſeated on the declivity of two hills. The river Coin runs through it to Fairford.

(1.) * **CHEEK**. *n. ſ.* [*ceac*, Saxon.] 1. The ſide of the face below the eye.—

And now and then an ample tear trill'd down
Her delicate *cheek*. *Shakeſpeare.*
Her beauty hangs upon the *cheek* of night,
Like a rich jewel in an Æthiop's ear. *Shakeſp.*
I ſhall ſurvey and ſpy
Death in thy *cheeks*, and darkneſs in thy eye.
Donne.
Daughter of the roſe, whoſe *cheeks* unite
The diff'ring titles of the red and white,
Who heaven's alternate beauty well diſplay
The bluſh of morning and the milky way. *Dryd.*

2. A general name among mechanicks for almoſt all thoſe pieces of their machines and inſtruments that are double, and perfectly alike. *Chambers.*

(2.) **CHEEKS**, in ſhip building, are two pieces of timber, fitted on each ſide of the maſt at the top, ſerving to ſtrengthen the maſts there. The uppermoſt bail or piece of timber in the beak of a ſhip, is called the *cheek*. The knees which faſten the beak head to the ſhip, are called *cheeks*; and the ſides of any block, or the ſides of a ſhip's carriage of a gun, are called *cheeks*.

(3.) **CHEEKS OF A GLAZIER'S VICE** are two pieces of iron joined parallel at top and bottom; in which are the axis, or ſpindles, little wheel, cuſhions, &c. whereof the machine is compoſed.

(4.) **CHEEKS OF A MORTAR.** See BRACKET, § 2.

(5.) **CHEEKS OF A PRINTING PRESS** are its two principal pieces, placed perpendicular, and parallel to each other; ſerving to ſuſtain the 3 ſommers; viz. the head, ſhelves, and winter, which bear the ſpindle and other parts of the machine. See PRINTING PRESS.

(6.) **CHEEKS OF A TURNER'S LATHE** are two long pieces of wood, between which are placed the puppets which are either pointed or otherwiſe, ſerving to ſupport the work, and the mandrils of the workman. Theſe two pieces are placed parallel to the horizon, ſeparated from one another by the thickneſs of the tail of the puppets, and joined with tenons to two other pieces of wood placed perpendicularly, called the *legs of the lathe*.

* **CHEEKBONE.** *n. ſ.* [from *cheek* and *bone.*] —I cut the tumour, and felt the ſlug: it lay partly under the os jugale, or *cheekbone*. *Wiſeman.*

* **CHEEKTOOTH.** *n. ſ.* [from *cheek* and *tooth.*] The hinder tooth or tuſk.—He hath the *cheekteeth* of a great lion. *Joel.*

* **CHEER.** *n. ſ.* [*chere*, Fr. entertainment; *cara*, Sp. the countenance. It ſeems to have, in Engliſh, ſome relation to both theſe ſenſes.] 1. Entertainment; provisions ſerved at a feaſt.—

But though my cates be mean, take them in
good part;
Better *cheer* you may have, but not with better heart. *Shakeſpeare.*

—His will was never determined to any purſuit of good *cheer*, poignant ſauces, and delicious wines. *Locke.* 2. Invitation to gaiety.—

You do not give the *cheer*; the feaſt is ſold
That is not often vouched, while 'tis making
'Tis given with welcome. *Shakeſpeare.*

3. Gaiety; jollity.—

I have not that alacrity of ſpirit,
Nor *cheer* of mind, that I was wont to have.
Shakeſpeare.

4. Air of the countenance.—

Right faithful true he was indeed and word,
But of his *cheer* did ſeem too ſolemn ſad.
Nothing did he dread, but ever was ydrad.
Spenſer.
Which publick death, received with ſuch a
cheer,
As not a ſigh, a look, a ſhrink bewrays
The leaſt felt touch of a degenerous fear,
Gave life to envy, to his courage praiſe. *Daniel.*
He ended; and his words their drooping *cheer*
Enlightened, and their languiſh'd hope reviv'd.
Milton.
At length appear
Her griſly brethren ſtretch'd upon the bier:
Pale at the ſudden ſight, ſhe chang'd her *cheer*.
Dryden.

5. Perhaps temper of mind in general; for we read of heavy *cheer*.—Then were they all of good *cheer*, and they alſo took ſome meat. *Acts.*

(1.) * *To* **CHEER.** *v. a.* [from the noun.] 1. To incite; to encourage; to inſpirit.—He complained that he was betrayed: yet, for all that was nothing diſcouraged, but *cheered* up the footmen. *Knolles.*—

He *cheer'd* the dogs to follow her who fled,
And vow'd revenge on her devoted head.
Dryden's Fables.

2. To comfort; to conſole.—

I died, ere I could lend thee aid;
But *cheer* thy heart, and be thou not diſmay'd.
Shakeſpeare.
Diſpleas'd at what, not ſuffering, they had ſeen,
They went to *cheer* the faction of the green.
Dryden.

3. To gladden.—

Hark! a glad voice the lonely deſert *cheers*;
Prepare the way, a God, a God appears!
Pope's Meſſiah.
The ſacred ſun above the waters rais'd,
Thro' heaven's eternal brazen portals blaz'd,
And wide o'er earth diffus'd his *cheering* ray.
Pope.

(2.) * *To* **CHEER.** *v. n.* To grow gay or gladſome.—

At ſight of thee my gloomy ſoul *cheers* up;
My hopes revive, and gladneſs dawns within me.
A. Philips.

* **CHEERER.** *n. ſ.* [from *To cheer.*] Gladner; giver of gaiety.—Angling was, after tedious ſtudy, a reſt to his mind, a *cheerer* of his ſpirits, a diverter

of ſadneſs, a calmer of unquiet thoughts. *Walton's Angler.*—Saffron is the moſt ſafeſt and moſt ſimple cordial, the greateſt reviver of the heart, and *cheerer* of the ſpirits. *Temple.*—

Prime *cheerer*, light,
Of all material beings firſt and beſt. *Thomſon.*

* CHEERFUL. *adj.* [from *cheer* and *full.*] 1. Gay; full of life; full of mirth.—

The *cheerful* birds of ſundry kind
Do chaunt ſweet muſick to delight his mind.
Fairy Queen.

2. Having an appearance of gaiety.—A merry heart maketh a *cheerful* countenance; but by ſorrow of the heart the ſpirit is broken. *Proverbs.*

* CHEERFULLY. *adv.* [from *cheerful.*] Without dejection; with willingneſs; with gaiety.—

Pluck up thy ſpirits, look *cheerfully* upon me.
Shakeſpeare.

To their known ſtations *cheerfully* they go. *Dryd.*

—Doctrine is that which muſt prepare men for diſcipline; and men never go on ſo *cheerfully*, as when they ſee where they go. *South.*—

May the man
That *cheerfully* recounts the female's praiſe,
Find equal love, and love's untainted ſweets
Enjoy with honour. *Philips.*

(1.) * CHERFULNESS. *n.ſ.* [from *chearful.*] 1. Freedom from dejection; alacrity.—Barbaroſſa, uſing this exceeding *cheerfulneſs* and forwardneſs of his ſoldiers, weighed up the fourteen gallies he had ſunk. *Knolles's Hiſtory of the Turks.*—With what reſolution and *cheerfulneſs*, with what courage and patience, did vaſt numbers of all ſorts of people, in the firſt ages of chriſtianity, encounter all the rage and malice of the world, and embrace torments and death? *Tillotſon.* 2. Freedom from gloomineſs.—I marvelled to ſee her receive my commandments with ſighs, and yet do them with *cheerfulneſs. Sidney.*

(2.) CHEERFULNESS ought to be diſtinguiſhed from *mirth*: Cheerfulneſs is an habit of the mind; *mirth* is conſidered as an act: Cheerfulneſs is fixed and permanent; *mirth* is ſhort and tranſient. A perſon may be often raiſed into the greateſt tranſports of mirth who is ſubject to the greateſt depreſſions of melancholy: on the contrary, cheerfulneſs, though it does not give ſuch an exquiſite gladneſs, prevents us from falling into depths of ſorrow. Mirth is like a flaſh of lightning, that breaks through a gloom of clouds, and glitters for a moment; cheerfulneſs keeps up a kind of daylight in the mind, and fills it with a ſteady and perpetual ſerenity. But it is impoſſible for cheerfulneſs to exiſt amid the fleeting vanities and viciſſitudes of an unſteady life, unaccompanied with patience and virtue.- "Our opinons, reputations connections, offices, buſineſs, (ſays Mr Jay) render us widely vulnerable. The characters of men are various; their purſuits and their intereſt perpetually claſh: Some try us by th ignorance, ſome by their folly; ſome by their perveſeneſs, ſome by their malice. Here then is an opportunity for the triumph of patience. We are very ſuſceptible of iritation; anger is eloquent; revenge is ſweet: but we ought to ſtand calm and collected, to ſuſpend the blow which paſſion was urgent to ſtrike; to drive the reaſons of clemency as far as they will go; to bring forward fairly in view the circumſtances of mitigation; to diſtinguiſh between ſurpriſe and deliberation, infirmity or crime; —our *peace* requires it.—The man of temper places himſelf beyond vexatious interruption;—by having the command of himſelf, he places a defence all around him, and forbids the entrance of ſuch unwelcome company to offend or diſcompoſe him. —A flood aſſails a rock, and rolls off unable to make an impreſſion; while ſtraws and boughs are born off in triumph, carried down the ſtream, driven and toſſed." Here is virtue; and the manſion of virtue is all ſunſhine and joy. She is ever gentle, lovely, and inviting: meekneſs, candour, complacency, condeſcending lovelineſs, endearing tenderneſs, and undeſigning love, manifeſts her preſence, and creates a heaven wherever ſhe appears. An enemy to melancholy; but not an enemy to mirth. Alacrity beams from her eyes; and the love of mankind is her conſtant theme. Every object around her; as if it borrowed luſtre from her preſence, looks gay and pleaſing. Her ſmile makes the ſorrowing forget their ſorrows, diſſipates care, and rekindles hope in the deſponding breaſt.

Though honours, riches, ceaſe to flow,
And beauty, mirth. and pleaſure fail,
Yet virtue, bright defies all woe;
And ſtill makes cheerfulneſs prevail.

* CHEERLESS. *adj.* [from *cheer.*] Without gaiety, comfort or gladneſs.—

For ſince mine eye your joyous ſight did miſs,
My cheerful day is turn'd to *cheerleſs* night.
Fairy Queen.

(1.) * CHEERLY. *adj.* [from *cheer.*] 1. Gay; cheerful.—They are uſeful to mankind, in affording them convenient ſituations of houſes and villages, reflecting the bengin and cheriſhing ſun beams, and ſo rendering their habitations both more comfortable and more *cheerly* in winter. *Ray on Creation.* 2. Not gloomy; not dejected.

(2.) * CHEERLY. *adv.* [from *cheer.*] Cheerfully.

Under heavy arms the youth of Rome
Their long laborious marches overcome;
Cheerly their tedious travels undergo. *Dryd. Vir.*

In God's name, *cheerly* on, courageous friends,
To reap the harveſt of perpetual peace,
By this one bloody trial of ſharp war. *Shakeſp.*

Oft liſtening how the hounds and horn
Cheerly rouſe the ſlumb'ring morn. *Milton.*

* CHEERY. *adj.* [from *cheer.*] Gay; ſprightly; having power to make gay; a ludicrous word.—

Come, let us hie, and quaff a *cheery* bowl;
Let cider new waſh ſorrow from thy ſoul. *Gay.*

(1.) * CHEESE. *n.ſ.* [*caſeus*, Lat. *cyſe*, Saxon.] A kind of food made by preſſing the curd of coagulated milk, and ſuffering the maſs to dry.—I will rather truſt a Fleming with my butter, the Welchman with my *cheeſe*, than my wife with herſelf. *Shakeſpeare.*

(2.) CHEESE, ANALYSIS, QUALITIES, USES, &c. OF. Cheeſe differs in quality according as it is made from new or ſkimmed milk, from the curd which ſeparates ſpontaneouſly upon ſtanding, or that which is more ſpeedily produced by the addition of runnet. Cream alſo affords a kind of cheeſe, but quite fat and butyraceous, and which does not keep long. Analyzed chemically, cheeſe appears to partake much more of an animal nature than butter, or the milk from which it was made. It is inſoluble in every liquid except ſpirit of nitre, and cauſtic alkaline ley. Shaved thin, and properly treated with hot water, it forms a very ſtrong cement mixed with quicklime. See Cement, § 2. When prepared with hot water, it is recommended in the Swediſh memoirs to be uſed by anglers as a bait: it may be made into any form, is not ſoftened by could water, and the fiſh are fond of it.—As a food, phyſicians condemn the too free uſe of cheeſe. When new, it is extremely difficult of digeſtion: when old, it becomes acid and hot; and, from Dr Percival's experiments, is evidently of a ſeptic nature. It is a common opinion that old cheeſe digeſts every thing, yet it is left undigeſted itſelf; but this is without any ſolid foundation. Cheeſe made from the milk of ſheep digeſts ſooner than that from the milk of cows, but is leſs nouriſhing; that from the milk of goats digeſts ſooner than either, but is alſo the leaſt nouriſhing. In general, it is a kind of food fit only for the laborious, or thoſe whoſe organs of digeſtion are ſtrong. Every country has places noted for this commodity: thus Cheſter and Glouceſter cheeſe are famous in England; and the Parmeſan cheeſe is in no leſs repute abroad. This ſort of cheeſe is entirely made of ſweet cow-milk; but at Rochefort in Languedoc, they make it of ewe's milk; and in other places it is uſual to add goat or ewe's milk in a certain proportion to that of the cow. There is likewiſe a kind of medicated cheeſe made by intimately mixing the expreſſed juice of certain herbs, as ſage, baum, mint, &c. with the curd, before it is faſhioned into cheeſe.—The Laplanders make a ſort of cheeſe of the milk of the rein deer; which is not only of great ſervice to them as food, but on many other occaſions. It is very common in theſe climates to have a limb numbed and frozen: their remedy for this is to heat an iron red hot, and thruſt it through the middle of one of theſe cheeſes: they catch what drops out, and with this anoint the limb, which ſoon recovers. They are ſubject alſo to coughs and diſeaſes of the lungs and theſe they cure by the ſame ſort of medicine: they boil a large quantity of the cheeſe in the freſh deer's milk, and drink the decoction in large draughts warm ſeveral times a day. They make a leſs ſtrong decoction of the ſame kind alſo, which they uſe as their common drink, for 3 or 4 days together, at ſeveral times of the year. They do this to prevent the miſchiefs they are liable to from their water, which is otherwiſe their conſtant drink, and is not good. Cheeſe pays on importation, per hundred weight, 1s. 3$\frac{4}{10}$d. and draws back on exportation 1s. 1$\frac{1}{2}$d. at the rate of 6s. 8d.

(3.) Cheese, best method of making, in England. The double *Glouceſter* is made from new, or (as it is called in that and the adjoining counties) *covered milk*. An inferior ſort is made from what is called *half covered milk*. Every farmer who has a ſufficient number of cows, makes a large cheeſe from one meal's milk. This, when brought in warm, is eaſily turned with the rennet; but if the morning or night's milk be mixed with that which is freſh from the cow, it will be longer before it turns, nor will it change ſometimes without being heated over the fire, by which it often gets ſoot or ſmoke, which gives the cheeſe a diſagreeable flavour. When the milk is turned, the whey is carefully ſtrained off. The curd is broke ſmall with the hands; and when equally broken, put by little at a time into the vat, which is filled an inch or more above the brim, that when the whey is preſſed out it may not ſhrink below it. Before the curd is put in, a cheeſe-cloth is laid at the bottom, ſo large, that when the vat is filled with the curd, that the ends of the cloth may turn again over the top of it. It is then taken to the preſs, and remains for two hours; when it is turned, and a clean cloth is put under it turned over as before. It is then preſſed again, and remains in the preſs 6 or 8 hours: when it is turned and rubbed on each ſide with ſalt. After this it is preſſed again for 12 or 14 hours: when, if any of the edges project, they are pared off. It is then put on a dry board, and regularly turned every day. The vat has 3 or 4 holes bored round the lower part of it, that the whey may drain perfectly from the cheeſe. Glouceſter cheeſe is coloured by mixing a little annotto with the milk before it is turned. No cheeſe will look yellow without it: and it is perfectly harmleſs in its nature and effects. As it is impoſſible to make good cheeſe with bad rennet, the following receipt ſhould be attended to. Let the *vell, maw*, or *rennet bag* be perfectly ſweet; for if it be the leaſt tainted, the cheeſe will never be good. Mix 3 pints or 2 quarts of ſoft water with ſalt; add ſweet-briar, roſe leaves and flowers, cinnamon, mace, cloves, and in ſhort, almoſt every ſort of ſpice and aromatic that can be procured. Theſe, put into 2 quarts of water, muſt boil gently till it is reduced to 3 pints, and care ſhould be taken that this liquor is not ſmoked. It ſhould be ſtrained clean from the ſpices, &c. and when found to be not warmer than milk from the cow, it ſhould be poured upon the vell or maw. A lemon may then be ſliced into it; when it may remain a day or two: After which it ſhould be ſtrained again, and put into a bottle; where, if well corked, it will keep good for a year. It will ſmell like a perfume; and a ſmall quantity of it will turn the milk, and give the cheeſe a pleaſing flavour. After this, if the vell be ſalted, and dried for a week or two near the fire, it will do for the purpoſe again almoſt as well as before. CHEDDER CHEESE is held in high eſteem; but its goodneſs is ſaid to be chiefly owing to the land whereon the cows feed, as the method of making it is the ſame as in Somerſetſhire, and the adjoining counties. CHESHIRE CHEESE is much admired; yet no people take leſs pains with the rennet than the Cheſhire farmers. But their cheeſes are ſo large as often to exceed 100 lb. each; to this (and the age they are kept, the richneſs of the land, and the keeping ſuch a number of cows as to make ſuch a cheeſe without adding a 2d meal's milk) their excellence may be attributed. The Cheſhire farmers alſo ſalt the curd and keep the cheeſes in a damp place after they are made, and are very careful to turn them daily. But no Engliſh cheeſe is more highly eſteemed than the STILTON, which is called the *Parmeſan* of England, and never ſold for leſs than 1s. or 1s 2d. per lb. The Stilton cheeſes are uſually made in ſquare vats, and weigh from 6 to

12 lb. each. As ſoon as they are made they are put into ſquare boxes made exactly to fit them; being ſo extremely rich, that unleſs this precaution be taken they are apt to break. They are daily turned in theſe boxes, and kept two years before they are properly mellowed for ſale. Farmers in the counties of Huntingdon, Rutland, and Northampton make a ſimilar ſort, ſell them for the ſame price, and give them all the name of *Stilton cheeſes*. The Stilton farmers make a cheeſe every morning; adding to the new milk the cream taken from that which was milked the night before. This, and the age of their cheeſes, are ſuppoſed the only reaſons why they are ſo good; for from the niceſt obſervation, it does not appear that their land is in any reſpect ſuperior to that of other counties Excellent cream cheeſes are made in Lincolnſhire, by adding the cream of one meal's milk to milk which comes immediately from the cow; theſe are preſſed gently 2 or 3 times, turned for a few days, and are then diſpoſed of at the rate of 1s. per pound, to be eaten while new with radiſhes, ſallad, &c. Cheeſes may be made from ſkimmed milk, which will ſell for at leſt 2d. per lb. and though they appear harder, experience hath proved them to be much eaſier of digeſtion than any new milk cheeſes.

(4.) **CHEESE, METHOD OF MAKING, IN PARMA, LODI, &c.** Mr Zappa of Milan, in anſwer to queries from Arthur Young, Eſq. gives the following account of the method of making the celebrated Parmeſan and Lodeſan cheeſe; with the previous management of the cows and milk. "From the middle of April, or ſooner if poſſible, the cows are ſent to paſture in the meadows till the end of November. When the ſeaſon is paſt, and ſnow comes, they are put into ſtables for the whole winter, and fed with hay. Between 9 and 10 in the morning the cows are ſent to water, and then to the paſtures, where they remain 4 or 5 hours, and at 3 or 4 o'clock are driven to the ſtables if the ſeaſon is freſh, or under porticos if hot; where, for the night, a convenient quantity of hay is given them. No owner will leave his cattle, without great cauſe, uncovered at night. The cows are milked morning and evening, with exception of ſuch as are near calving: 100 cows form a dairy farm of a good large cheeſe; 80 are in milk, and 20 with calves ſucking, or near calving. They reckon one with the other about 32 boccalis of 32 oz. of milk. Such is the quantity for a cheeſe of about 70 lb of 28 ounces. They join the evening with the morning milk, becauſe it is freſher than that of the morning and evening of the ſame day. The morning milk would be 24 hours old, when the next morning the cheeſe ſhould be made. From the evening milk all the cream poſſible is taken away for butter, *maſcarponi*, i. e. cream cheeſe, &c. The milk of the morning ought to be ſkimmed ſlightly; but every one ſkims as much cream as he can. The butter is ſold on the ſpot immediately at 24 ſous; the cheeſe at about 28 ſous. The butter loſes nothing in weight, the cheeſe loſes one third of it, is ſubject to heat, and requires expences of ſervice, attention, ware houſes, &c. before it is ſold; and a man in two hours makes 45 or 50 lb. of butter that is ſold directly. However it is not poſſible to leave much cream in the milk, to make Lodeſan cheeſe, called *grained cheeſe*; becauſe if it is too rich, it does not laſt long, and it is neceſſary to conſume it while young and ſound. Parmeſan or Lodeſan cheeſe is made every day in the year with 100 cows. In winter, however, the milk being leſs in quantity, the cheeſe is of leſſer weight but certainly more delicate." "The morning of the 3d of March 1786, (adds Mr Zappa,) I have ſeen the whole operation, having gone on purpoſe to the ſpot, to ſee the whole work from beginning to end. At 16 Italian hours, or ten in the morning, the ſkimming of that morning's milk, gathered only two hours before, was finiſhed. I did, meanwhile examine the boiler or pot. At the top it was 8 feet (Engliſh) diameter, or thereabout; and about 5 feet 3 inches deep, made like a bell, and a narrowing towards the bottom to about 2½ feet. They joined the cream produced that morning with the other produced by the milk of the evening before. That produced by this laſt milk was double in quantity to that of the morning milk, becauſe it had the whole night to unite, and that of the morning had only two hours, in which it could not ſeparate much. Of the cream ſome was deſtined to make maſcarponies, and they put the reſt into the machine for making butter. Out of the milk of the evening before and of that morning that was all put together after ſkimming, they put into the boiler 272 boccali, and under it two faggots of wood; which being burnt, were ſufficient to give the milk a warmth a little ſuperior to lukewarm. Then the boiler being withdrawn from the fire, the foreman put into it the rennet, which they prepared in ſmall balls of one ounce each, turning the ball in his hand always kept in the milk entirely covered; and after it was perfectly diſſolved, he covered the boiler to keep the milk defended, that it might not ſuffer from the coldneſs of the ſeaſon, in particular as it was a windy day. I went then to look on the man that was making maſcarponies, &c. and then we went twice to examine if the milk was ſufficiently coagulated. At the 18 hours, according to the Italian clocks, or noon, the true manufactory of cheeſe began. The milk was coagulated in a manner to be taken from the boiler in pieces from the ſurface. The foreman, with a ſtick that had 18 points in each ſide, began to break exactly all the coagulated milk, and did continue to do ſo for more than half an hour, from time to time examining it to ſee its ſtate. He ordered to renew the fire, and four faggots of willow branches were uſed all at once: he turned the boiler that the fire might act; and then the underman began to work in the milk with a ſtick like the above, but with only 4 ſmaller ſticks at the top, forming 8 points, 4 at each ſide, a ſpan long each point. In a quarter of an hour the foreman mixed in the boiler the proper quantity of ſaffron, and the milk was all in knobs, and finer grained than before, by the effect of turning and breaking the curd, continually. Every moment the fire was renewed or fed; but with a faggot only at a time, to continue it regular. The milk was never heated much, nor does it hinder to keep the hand in it to know the fineneſs of the grain, which refines continually by the ſtick work of the underman. It is of the greateſt conſequence to mind when the grain begins to take a conſiſtence. When it comes to this ſtate, the boiler is turned from the fire, and the underman immediately takes out the whey, putting it into proper receivers. In that manner the grain ſubſides to the bottom of the boiler; and leaving only in it whey enough to keep the grain covered a little, the foreman extending himſelf as much as he can over and in the boiler, unites with his hands the grained milk, making like a body of paſte of it. Then a large piece of linen is run by him under that paſte, while another man keeps the 4 corners of it, and the whey is directly put again into the boiler, by which is facilitated the means of raiſing that paſte that is taken out of the boiler, and put for one quarter of an hour into the receiver, where the whey was put before, in the ſame linen it was taken from the boiler; which boiler is turned again directly on the fire, to extract the *maſcarpa* (whey-cheeſe); which is a 2d product eaten by poor people. After the paſte, remained for a quarter of an hour in that receiver, it was taken out and turned into the wooden forms called *faſſera*, without any thing elſe made than the rotundity, having neither top nor bottom. Immediately after having turned it into that round wooden form, they put a piece of wood like a cheeſe on it, putting and increaſing gradually weights on it, which ſerve to force out the remnant of whey; and in the evening the cheeſe ſo formed is carried into the warehouſe, where, after 24 hours, they begin to give it the ſalt. It remains in that houſe for 15 or 20 days; but in ſummer only from 8 to 12 days. Meanwhile the air and ſalt form the cruſt to it; and then it is carried into another warehouſe for a different ſervice. In the ſecond warehouſe they turn every day all the cheeſes that are not older than 6 months; and afterwards it is enough if they are only turned every 48 or 60 hours, keeping them clean, in particular of that bloom, which is inevitable to them, and which, if neglected, turns muſty, and cauſes the cheeſe to acquire a bad ſmell. The Lodeſan, becauſe it is a province watered, has a great deal of meadows, and abounds with cows, its product being moſtly in cheeſe, butter, &c. However, the province of Pavia makes a great deal of that cheeſe; and we Milaneſe do likewiſe the ſame from the ſide of Porte Toſa, Romana, Ticineſe, and Vercillina, becauſe we have fine meadows and dairy farms."

* Cheesecake. *n. ſ.* [from *cheeſe* and *cake.*] A cake made of ſoft curds, ſugar and butter.—

Where many a man at variance with his wife,
With ſoft'ning mead and *cheeſecake* ends the ſtrife. *King*,

*Cheesemonger. *n. ſ.* [from *cheeſe* and *monger.*] One who deals in cheeſe.

* Cheesepress. *n. ſ.* [from *cheeſe* and *preſs.*] The preſs in which the curds are preſſed.—

The cleanly *cheeſepreſs* ſhe could never turn;
Her aukward fiſt did ne'er employ the churn.
Gay's Paſtorals.

(1.) Cheese rennet. See Runnet.

(2.) Cheese rennet, in botany. See Galium.

* Cheesevat. *n. ſ.* [from *cheeſe* and *vat.*] The wooden caſe in which the curds are confined when they are preſſed into cheeſe.—His ſenſe occaſions the careleſs ruſtick to judge the ſun no bigger than a *cheeſevat*. *Glanville.*

* CHEESY. *adj.* [from *cheeſe.*] Having the nature or form of cheeſe.—Acids mixed with them precipitate a tophaceous chalky matter, but not a *cheeſy* ſubſtance. *Arbuthnot on Aliments.*

CHEF D'OEUVRE, [Fr.] a maſter-piece.

CHEFFIELD, a village in Hertfordſh. N. of Stevenage.

CHEGFORD, a ſmall town in Devonſh. 15 miles from Exeter, and 89 from London. It has fairs March 25, May 25. Sept. 29, and Oct. 29.

CHEGOE, in entomology. See Nigua.

CHEILOCACE, a ſwelling of the lips, to which the inhabitants of northern countries, eſpecially children, are ſaid to be very ſubject.

CHEIRANTHUS, stock gilliflower, or *Wallflower:* A genus of the 39th natural order, *Siliquoſæ;* and belonging to the tetradynamia claſs of plants. The germen is marked with a glandulous denticle on each ſide; the calyx is cloſe, with two of its leaves gibbous at the baſe; the ſeeds plane. There are 13 ſpecies, of which the following are moſt worthy of notice.

1. Cheiranthus annuus, or ten weeks ſtock, with an upright, woody, ſmooth ſtalk, divided into a branchy head. 12 or 15 inches high, garniſhed with ſpear-ſhaped, blunt, hoary leaves, a little indented. and all the branches terminated by long erect ſpikes of numerous flowers of different colours in different varieties.

2. Cheiranthus cheiri, or the common Wall-flower, with ligneous, long, tough roots; an upright, woody, abiding ſtalk, divided into many erect angular branches, forming a buſhy head from one to two feet high, cloſely garniſhed with ſpear-ſhaped, acute, ſmooth leaves, and all the branches terminating in long erect ſpikes of numerous flowers, which in different varieties are yellow, bloody, white, &c.

3. Cheiranthus incanus, the hoary cheiranthus, with ligneous, long, naked, white roots; and upright, ſtrong, woody, abiding ſtem, from one to three feet high, branchy at top, adorned with long, ſpear-ſhaped, obtuſe, hoary leaves; and the top of the ſtalk and all the branches terminated by erect ſpikes of flowers from one to 2 or 3 feet long, of different colours in different varieties. The 2 laſt ſorts are very hardy evergreen biennials or perennials; but the firſt, being an annual plant, muſt be continued by ſeed ſown every year; and even the 2 laſt, notwithſtanding their being perennial, degenerate ſo much in their flowers after the firſt year, that it will be proper alſo to raiſe an annual ſupply of them. The ſeeds are to be ſaved only from the plants with ſingle flowers; for the double ones bring no ſeeds to perfection. The ſeeds are to be choſen from ſuch flowers as have 5, 6, or more petals, or from ſuch as grow near to the double ones. They may be ſown in the full ground in the ſpring, and afterwards tranſplanted. When fine doubles of the 2 laſt kinds are obtained, they may be multiplied by ſlips from the old plants,

CHEITORE, or OUDIPOUR, a principal rajapoot ſtate, and a city of Hindooſtan. See OUDIPOUR.

CHEKAO, in natural hiſtory, an earth found in many parts of the Eaſt Indies, and ſometimes uſed by the Chineſe in their porcelain manufactures. It is a hard ſtony earth; and the manner of uſing it is this: They firſt calcine it in an open furnace, and then beat it to a fine powder. This powder they mix with large quantities of water: then ſtirring the whole, they let the coarſer part ſubſide; and pouring off the reſt yet thick as cream, they leave it to ſettle, and uſe the matter which is found at the bottom in form of a ſoft paſte. It retains that humidity a long time, and ſupplies the place of the earth called HOACHE, in the making of that elegant ſort of china ware, which is all white, and has flowers which ſeem formed by a mere vapour within its ſurface. The manner of uſing it is this: They firſt make the veſſel of the common matter of the manufacture; when this is almoſt dryed, they paint upon it the flowers or other figures, with a pencil dipt in this preparation of the chekoa; when this is thoroughly dry, they cover the whole veſſel with the varniſh in the common way, and bake it as uſual. The conſequence is, that the whole is white: but the body of the veſſel, the figures, and the varniſh, being three different ſubſtances, each has its own particular white; and the flowers being painted in the fineſt white of all, are diſtinctly ſeen through the varniſh upon the veſſel, and ſeem as if traced by a vapour only. The hoache does this as well as the chekao: and has beſides the quality of ſerving for making the porcelain ware either alone, or in the place of kaolin: the chekao has not this property, nor any other ſubſtance beſides this hoache, which appears to be the ſame with our STEATITES, or ſoap-rock.

CHEKE, Sir John, a celebrated ſtateſman, grammarian and divine, of an ancient family in the Iſle of Wight, was born at Cambridge, in 1514, and educated in that univerſity; where, after taking his degrees in arts, he was firſt choſen Greek lecturer, and in 1540, profeſſor of that language, with a ſtipend of L.40 a-year. In this ſtation he was principally inſtrumental in reforming the pronunciation of the Greek language, which having been much neglected, was imperfectly underſtood. In 1544, he was ſent to the court of Henry VIII. and appointed tutor for the Latin language, jointly with Sir Anthony Cooke, to prince Edward, about which time he was made canon of the college newly founded in Oxford. On the acceſſion of his royal pupil to the crown, he was firſt rewarded with a penſion of 100 merks, and afterwards obtained ſeveral conſiderable grants from the crown. In 1550, he was made chief gentleman of the privy chamber; in 1551, he was knighted; in 1552, made chamberlain of the exchequer; in 1553, clerk of the council; and ſoon after ſecretary of ſtate and privy concillor. But theſe honours were of ſhort duration. Having concurred in the meaſures of the duke of Northumberland, ſettling the crown on the unfortunate lady Jane Grey, and acted as her ſecretary during the 9 days of her reign, on the acceſſion of queen Mary he was ſent to the tower, and ſtript of the greateſt part of his poſſeſſions. In Sept. 1554, he obtained his liberty, and a licence to go abroad. He firſt went to Baſil, thence to Italy, and afterwards returned to Straſburg, where he was reduced to the neceſſity of reading Greek lectures for ſubſiſtence. In 1556, he ſet out in an evil hour to meet his wife at Bruſſels: but, before he reached that city, he was ſeized by order of Philip II. hoodwinked, and thrown into a waggon; and thus ignominiouſly conducted to a ſhip, which brought him to the tower of London. He ſoon found that religion was the cauſe of his impriſonment; for he was immediately viſited by two Romiſh prieſts, who piouſly endeavoured to convert him, but without ſucceſs. However, he was viſited by Fleckenham; who told him from the queen, that he muſt either comply or burn. Sir John accordingly complied in form, and his lands were reſtored: but his remorſe ſoon put an end to his life. He died in Sept. 1557, at the houſe of his friend Mr Peter Oſborne in Wood ſtreet, London, and was buried in St Alban's church. He left 3 ſons, the eldeſt of whom, Henry, was knighted by queen Elizabeth. He wrote, 1. A latin tranſlation of two of St Chryſoſtom's homilies. Lond. 1543, 4to. 2. The Hurt of Sedition. Lond. 1549, 1576, 1641. 3. Latin Tranſlation of the Engliſh Communion Service: Printed among Bucer's opuſcula. 4. *De pronunciatione Græcæ*. Baſil, 1555. 8vo. 5. Several letters publiſhed in his life by Strype; and a great number of other books.

CHEKESGROVE, a town E. of Hindon, Wilts.

CHEKIANG, or CHE-KYANG, or TCHE-KIANG, a province of China. See TCHE-KIANG.

CHELANDIUM, or CHELANDRIUM, [κιλανδειον,] in writers of the middle age, a veſſel of great length, carrying 150 ſeamen and oars, reſembling an Italian galley.

CHELAZIUM, a moveable tubercle in the eye-lid, called in Engliſh a *ſtye*.

CHELBOROUGH, EAST, CHELBOROUGH, WEST, two towns near Everſhot, Dorſetſhire.

CHELDON, NE. of Chimleigh, Devonſhire.

CHELFORD, W. of Macclesfield, Cheſhire.

CHELIDONIAS, according to Pliny, an anniverſary wind, blowing at the appearance of the ſwallows; otherwiſe called FAVONIUS, or ZEPHYRUS.

CHELIDONIUM, CELANDINE, HORNED or PRICKLY POPPY: A genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 27th order *Rhœadeæ*. The corolla is tetrapetalous, the calyx diphyllous, the ſiliqua unilocular and linear. There are 6 ſpecies, none of which are remarkable for their beauty. One of them, however, viz.

CHELIDONIUM MAJUS, is an article in the materia medica. It grows on old walls, among rubbiſh, and in waſte ſhady places. The herb is of a bluiſh green colour; the root of a deep red; and both contain a gold-coloured juice: the ſmell is diſagreeable, the taſte ſomewhat bitteriſh, very acrid, burning and biting the mouth; the root is the moſt acrid. The juice takes off warts; cures tetters, ring-worms, and the itch; and, diluted with milk, it conſumes opaque white ſpots on the eye. Horſes, cows, goats, and ſwine, refuſe to eat the herb.

CHELIDONIUS LAPIS, [from χελιδων, a ſwallow,] in natural hiſtory, a ſtone ſaid by the ancients to be found in the ſtomachs of young ſwallows, and greatly cried up for its virtues in the epilepſy; but from the deſcription, it appears to be only a ſpecies of lycodontes, or buffonitæ. See BUFONITA and LYCODONTES.

CHELIVE, a town NE. of Chirbury, Salop.

CHELL, in Staffordſhire, near Burſlem.

CHELLASTON, 3 miles E. of Derby.

CHELLINGTON, 3 villages; 1. in Bedfordſhire, between Bedford and Okeham: 2. in Sommerſetſhire, S. of Ilminſter: and, 3. in Staffordſh. near Dudley caſtle.

(1.) CHELM, a palatinate of Poland, in the province of Red Ruſſia.

(2.) CHELM, the capital of the above palatinate, and a biſhop's ſee, under the archbiſhop of Lamberg, 100 miles ESE. of Warſaw. Lon. 23. 30. E. Lat. 51. 20 N.

CHELMARSH, S. of Bridgenorth, Salop.

CHELMER, a river of Eſſex, which riſes near Thaxted, flows S. by Dunmow to Chelmsford; thence takes an eaſterly direction to Malden, where it joins the Black water; and forming the æſtuary called *Malden water*, enters the German ocean. It is navigable up to CHELMSFORD.

CHELMERSCOTE, a village in Warwickſh. near Brayles.

CHELMERTON, in the Peak of Derby.

CHELMONDESTON, or CHEMSTON, a town in Suſſex, between Ipſwich and Harwick.

(1.) CHELMSFORD, a populous town nearly in the centre of Eſſex, ſeated in a beautiful valley between the Chelmer and the Can, to which rivers the gardens on each ſide of the town extend. Maurice, Bp. of London, firſt made it a place of importance, A. D. 1100, by building a bridge of 3 arches over the Can; which, being narrow, tho' very durable, was lately taken down, and an elegant ſtone bridge of one arch erected in its ſtead. The natural confluence of theſe rivers is about half a mile from the town; but a little below the bridge, the Chelmer is diverted into the Can, by a canal. Chelmsford is ſeparated by the Can from the hamlet of MOULSHAM. The principal ſtreet is ſpacious, and adorned with elegant buildings; but, owing to a diſpute, when the act for paving and lighting it, &c. was obtained, a ſingular compromiſe took place; in conſequence whereof, it is paved with flag ſtones only on one ſide, the other, as well as the carriage road, being paved with gravel. The town has an ancient Gothic church; a free ſchool founded by Edward VI.; a theatre, and a magnificent new county houſe, fronted with ſtone, and placed with great taſte, in an oblique poſition, at the end of the high ſtreet; thus indicating a farther opening to the new conduit, which is adorned with elegant figures from Coade's ſtone manufactory, and ſupplies the town with excellent water. Chelmsford is a great thoroughfare, the E. road from London paſſing thro' it; and, being the county town, the quarter ſeſſions, aſſizes, &c. are held in it. It has a market on Friday; fairs May 12, and Nov. 12, and ſends two members to parliament. It lies 21 miles SW. by W. of Colcheſter, 29 NE. by E. of London, and 43 S. by W. of Bury. Lon. 0. 33. E. Lat. 51. 43 N.

(2.) CHELMSFORD, a town of Maſſachuſetts, in Middleſex county, ſituated on the S. ſide of the Merrimack, over which is a curious bridge, at Patucket Falls, which connects the town with Dracut. It is 28 miles NNW. of Boſton.

CHELONE, in botany, a genus of the angioſpermia order, belonging to the didynamia claſs of plants; and in the natural method ranking under the 40th order, *Perſonatæ*. The calyx is quinquepartite; the rudiment of a 5th filament among the higheſt ſtamina; the capſule bilocular. There are three ſpecies, viz.

1. CHELONE GLABRA,
2. CHELONE HIRSUTA, &
3. CHELONE PENSTEMON.

They are all natives of North America; and are herbaceous flowery perennials, with upright ſtalks two feet high, decorated with ſpear-ſhaped leaves, and beautiful ſpikes of monopetalous, ringent flowers, red, roſe-coloured, blue, and purple. They flower from Sept. to Nov. and are ſometimes ſucceeded by ripe ſeeds in this country. They are very hardy, and may be propagated by ſeeds in any ſoil; but the two firſt multiply ſo faſt by their creeping roots, that the ſeeds are ſeldom regarded.

CHELONITES, [from χελωνη, a tortoiſe,] a ſtone ſaid to be found in the Indian tortoiſe, and to have the faculty of reſiſting poiſon. *Chambers.*

(1.) CHELSEA, a fine village, ſituated on the N. bank of the Thames, a mile W. of Weſtminſter, remarkable for the magnificent hoſpital for invalids and old decrepit ſoldiers; a pleaſure houſe called Ranelagh, to which a great deal of fine company reſort in ſummer; and a noble botanic garden belonging to the company of apothecaries. The royal hoſpital for invalids was firſt projected by Stephen Fox, who himſelf contributed above L.13,000 to its eſtabliſhment. It was begun by Charles II. carried on by James II. and finiſhed by William III. It conſiſts of a vaſt range of buildings, that form 3 large ſquares, uncommonly elegant. In the wings are 16 wards, in which are accommodations for above 400 men; and there are beſides, in the other buildings, a conſiderable number of apartments for officers and ſervants. The whole expence of erecting the building is computed to have been L. 150,000, and the extent of its area is about 48 acres. It is under the direction of commiſſioners, who conſiſt generally of officers of ſtate and of war. The governor has a ſalary of L.500, the lieutenant governor L. 400, the major L. 250. The phyſician, ſecretary, comptroller, deputy-treaſurer, ſteward, and ſurgeon, have each L. 100 yearly, and many of the other officers have conſiderable ſalaries. There are alſo inferior officers, ſerjeants, corporals, and drums, with 400 men, who all do garriſon duty; and there are above 10,000 out-penſioners who receive an annuity of 7l. 12s. 6d. each; all which expence is defrayed by a poundage deducted from the army, deficiencies being made good by parliament. It has been well obſerved, that "This is unqueſtionably a noble monument of national gratitude and humanity; but (it has alſo been obſerved, that) was there no ſuch local eſtabliſhment, the ſaving of the vaſt expences incurred by it, would enable government to make a much more comfortable proviſion for all our brave veterans as out-penſioners; who, in that caſe, inſtead of being collected in an hoſpital, far from ‘ the tender charities of father, ſon, and brother;’ might more happily ſpend the evening of their life in the boſom of their families.” And here it ſhould have been remembered, that tho’ many *might* and perhaps would be more comfortable under the care and amidſt the kind offices of relations, than in an hoſpital, by ſuch an inſtitution there are many taken care of and ſupported, who could not poſſibly ſubſiſt on an out-penſion, but behoved to periſh, or be a burden and a grief inſtead of a comfort to their relatives. The botanic garden is very extenſive, enriched with a variety of domeſtic and exotic plants, the original ſtock of which was given to the apothecaries of London by Sir Hans Sloane. At Ranelagh Garden and amphitheatre the entertainment is a fine band of muſic, with an organ and ſome of the beſt voices; and the regale tea and coffee, &c. The rotunda is one of the fineſt ſtructures of the kind in Europe.

(2.) Chelsea, a town of Maſſachuſetts, in Suffolk county, containing 472 citizens.

(3.) Chelsea, a townſhip of Vermont, in Orange county.

CHELSFORD, a village in Kent, SW. of St Mary Cray.

CHELSHAM, in Warlingham pariſh, Surry.

(1.) CHELSWORTH, near Cricklade, Wilts.

(2.) Chelsworth, NW. of Hadley, Suffolk.

CHELTENHAM, or Chiltenham, a market town, 9 miles NE. of Glouceſter, and 95 from London, which takes its name from the rivulet Chilt paſſing through it into the Severn from Dowdeſwell. The town lies in a flat marſhy ſoil, on the borders of a fine fertile vale, about 2 miles from Clieve, Preſbury, and Lockhampton hills, which joins the Cotſwolds, and form a kind of ſemicircle, defending the town from thoſe cold blaſts which proceed from the eaſtern quarter. It conſiſts of one handſome ſtreet, nearly a mile long. There is no manufacture carried on, but the poorer inhabitants ſpin wool for the clothiers around. On an eaſy aſcent, about half a mile S. of the church, riſes the Spaw, which firſt attracted the attention of the public in 1740. It is aſcended by pleaſant gravel walks, and at the Spaw there is a walk 200 yards long, and 20 feet broad. The ſeaſon for drinking the waters is from May to Oct. They are impregnated with ſalts, ſulphur, ſteel, calcareous earth, and operate at the ſame time as purgative and reſtorative, very much reſembling thoſe of Scarborough. Other ſprings of the ſame quality are found not far diſtant, but they are not frequented. Dry weather is the beſt for theſe waters, as well as for all mineral waters; they are more plentiful in rainy ſeaſons, but not ſo powerful. The town has a market on Thurſday, and fairs on Holy Thurſday, St James's day, and the 2d Thurſday in September. It has been much improved within theſe twenty years. A new market-houſe has been erected, the ſtreets cleaned, and on each ſide a convenient foot-way of flagſtones: a theatre has alſo been erected, to which his preſent majeſty, George III, who viſited it in 1788, gave the importance of a threatre-royal. Lon. 2. 21. W. Lat. 51. 55. N.

CHELTON, NE. of Bridgewater, Somerſet.

CHELVESTON, in Northamptonſhire, NE. of Higham-Ferrers.

CHELUM, a river of Hindooſtan proper, which riſes above the city of Caſhmere, and flowing SE. through the province, unites with the Indus below Moultan. In the time of Alexander the Great, it was called Hydaspes.

* CHELY. *n. ſ.* [*chela*, Lat.] The claw of a ſhell fiſh.—It happeneth often, I confeſs, that a lobſter hath the *chely*, or great claw, of one ſide longer than the other. *Brown.*

CHELYS, in antiquity, a muſical inſtrument of the pulſative kind, ſaid to have been invented by Mercury, and formed of a ſhell found in the Nile, at low water.

CHELYSMA, or Cuneus, in antiquity, a thick pieces of wood which the Greeks fixed to the keels of their ſhips, to ſave them from being worn or broken.

CHEMA, a certain meaſure mentioned by the Greek phyſicians, which Blanchard thinks contained two ſpoonfuls.

CHEMACH, or Kemach, a town of Aſiatic Turkey, in the ſouthern part of Caramania.

CHEMAL, a town of Perſia, in the province of Chuſiſtan, 110 miles S. of Suſter.

CHEMARIM. See Chamarim.

CHEMAZE, a town of France, in the department of Mayenne, and chief place of a canton, in the diſtrict of Chateau Gontier, one league and a half SW. of Chateau Gontier.

CHEME, in Roman antiquity, a liquid meaſure, containing the 5th part of a cyathus.

CHE-MEN, a town of China, of the 3d rank, in the province of Tchekiang, 20 miles SSW. of Kiahing.

CHEMERE, a town of France, in the department of Mayenne, and chief place of a canton, in the diſtrict of Evron, 4 leagues and a half SE. of Laxal.

CHEMERY, a town of France, in the department of Ardennes, and chief place of a canton, in the diſtrict of Sedan, 7 miles S. of Sedan.

CHEMICAL. See Chymical.

CHEMILLE, a town of France, in the department of Maine and Loire, and chief place of a canton, in the diſtrict of Chollet on the Ironne, 3 leagues and a half NE. of Chollet.

CHEMIN, *n. ſ.* [Fr.] a way; a road.

CHEMINON, a town of France, in the dept. of the Marne, 10 miles E. of Vitry-le-Francois.

(1.) CHEMISE, in fortification, the wall with which a baſtion, or any other bulwark of earth, is lined for its greater ſupport and ſtrength; or the ſolidity of the wall from the talus to the ſtone row.

(2.) Chemise, fire, a piece of linen cloth, ſteeped in a compoſition of oil of petrol, camphor, and other combuſtible matters, uſed at ſea, to ſet fire to an enemy's veſſel.

CHEMIST. See Chymist.

* CHEMISTRY. See Chymistry.

CHEMISTRY.

Sect. I. Definition of Chemistry.

(1.) THE late Dr Irvine derived the word *Chemiſtry* from the Greek χευμα, and that from the verb χεω, which denotes the act of liquifying. According to this etymology, *Chemiſtry* originally meant the art of *melting* bodies.

(2.) There are two ways in which matter obtrudes itſelf upon our contemplation; 1. as forming an aggregate or maſs, 2. as being compoſed of parts ſo minute, that each eſcapes the notice of our ſenſes. When matter is preſented in maſs, we can meaſure its bulk, aſcertain its weight and the quantity of matter included in the maſs; we can calculate its motion, and the changes in the direction of its motion produced by external cauſes. This is the proper object of Natural Philoſophy; or, as it has lately been more properly called, the Mechanical Philoſophy; and its object is to inveſtigate the laws to which matter in maſs is ſubjected, whether on our earth, or compoſing the planetary ſyſtem, or the countleſs ſyſtems to which we give the name of the univerſe.

(3.) Chemiſtry is of equal extent with the Mechanichal Philoſophy, having no other limits than the empire of matter. Its object is to inveſtigate the laws to which the minuter parts of matter are ſubjected, their motions and changes, which eſcape the notice of our ſenſes, and are known only by their effects.

Sect. II. History of Chemistry.

(4.) In Chemiſtry, as in moſt other fields of enquiry, we muſt diſtinguiſh two periods: 1. That of Art. 2. That of Science.

(5.) When Chemiſtry exiſted as an art, it conſiſted of a number of detached facts and obſervations, between which no connection was perceived, nor was any general law, or principle, diſcovered, to combine theſe facts into a regular ſyſtem.

(6.) In this firſt ſtate, Chemiſtry, to a greater or leſſer extent, muſt have been coëval with man. The objects with which he was ſurrounded would naturally attract his notice and excite his curioſity to know their properties. The firſt great object of man is food; and ſome philoſophers have defined him to be a *cooking animal.* He does not, like other animals, devour his food in the ſtate in which it is preſented by Nature; but ſubjects it to a previous preparation. It is probable therefore that the firſt Chemical obſervations would be made in the preparation of food, which would be gradually extended to ſubſtances which might aſſiſt the curing of wounds, and the alleviation of diſeaſe.

(7.) At what time, or by whom, the art of kindling artificial fires was firſt invented, is loſt in the abyſs of antiquity. The Grecian fables refer this diſcovery to Prometheus, who is ſaid to have ſtolen fire from Heaven. If he was the author of the invention, he was very ill rewarded for ſuch an important diſcovery. It is probable that the fires which were kept up in the temples of Veſta, tho' they were continued from ſuperſtitious motives, originated in a fear that all fires might become extinguiſhed without a reſource of this kind, from which they might be re-kindled. Navigators diſcovered ſome iſlanders in the South Sea to whom the uſe of fire was unknown, and when they firſt ſaw it kindled, they fell down and worſhipped it as a God.

(8.) The diſcovery of artificial fire was a great era in Chemiſtry, as it led to other diſcoveries of great importance. It led to the liquifaction of metals, and to the fabrication of them into uſeful or ornamental forms. It is probable that gold, and ſilver, and ſuch metals as Nature preſents in their metallic form, would be the firſt that would attract attention, and be ſubjected to fuſion and fabrication. This would gradually lead to the extraction of metals from their ores, and to the reduction of thoſe in the ſtate of oxyds to their metallic form. It appears that iron, the moſt univerſal, as well as the moſt uſeful of all the metals, was the laſt which they ſucceeded in reducing into a metallic ſtate.

(9.) In the Book of Geneſis, we read of Tubal-Cain, the 8th from Adam, as the inſtructor of every artificer in braſs and iron. Some reckon this perſon to be the Vulcain of the Greeks and Romans; and it is not probable that this particular notice would have been taken of him, had he only improved the practice of an art which had been known before. It ſeems highly probable, that he not only acted as a ſmith to fabricate inſtruments from theſe metals; but that he had actually diſcovered the method of reducing them into the metallic form—a diſcovery of great difficulty at ſuch an early period. It is probable the profeſſions of ſmelter and founder would long be united in one perſon, as, in certain caſes, they are ſtill found united, among eaſtern nations, at this day.

(10.) Pliny aſcribes the invention of glaſs to ſome merchants in the Levant, who, having nitre (or rather potaſs) on board, had kindled a fire on the beach to prepare their food, and had uſed lumps of the potaſs to ſupport their pots. To their great ſurpriſe the heat melted part of the potaſs, in contact with the ſand, into a tranſparent ſubſtance. Others aſcribe the diſcovery to a ſimilar accident among the Phenicians, at a much earlier period.

(11.) Whatever credit may be due to theſe accounts, it is certain that glaſs was known among the Egyptians at a very early period. They alſo practiſed the art of painting on glaſs, and enamel. They are ſaid to have imitated the emerald, whoſe colour is green. But it ſeems they had only acquired a knowledge of the coarſer kinds of glaſs, whoſe colour is green.

(12.) Moſes, who was ſkilled in all the wiſdom of the Egyptians, has been ranked among the earlieſt Chemiſts. As a proof of his proficiency, the means he employed to render the golden calf, which had been fabricated by the Iſraelites potable, have been adduced. In later times, this problem long exerciſed the ingenuity of Chemiſts, until it was diſcovered that gold could be rendered potable by combining it with ſulphur of potaſs, and that the preparation had a very nauſeous taſte, and hence drinking it might be a very proper puniſhment to the Iſraelites. But from the XXXII. Chap. of Exodus, it is not certain whether Chemical or Mechanical means were chiefly employed in reducing the calf to powder, and the object ſeems to have been, not to puniſh, but to impreſs the people with the abſurdity of worſhipping a God, which could not defend itſelf.

(13.) Among the Egyptians, *Hermes*, or *Mercurius Triſmegiſtus*, as he was called among the Greeks, was much celebrated for his profound knowledge in Chemiſtry. To this perſon, many thouſand volumes were aſcribed; but inſtead of being a real perſon, Hermes ſeems to have been a fabulous Deity, who was ſuppoſed to preſide over all the Arts and Sciences, and whoſe name was prefixed to all treatiſes concerning them. Their prieſts are ſaid to have been acquainted with many Chemical proceſſes; but, their knowledge was kept as a ſecret among their own order, and their writings were expreſſed in myſtical characters, which none but the initiated could comprehend. They are ſaid to have been acquainted with the preparation of many medicines, perfumes, plaſters, and ſoaps. They uſed burnt aſhes as cauſtic ſubſtances; they fabricated bricks, glaſs, porcelain; painted on glaſs, and practiſed the art of gilding with ſilver and gold. They extracted natron or ſoda from the mud of the Nile, and from the ſediment of certain lakes after the water was evaporated. They prepared alum, ſea-ſalt, and ſal ammoniac; and were acquainted with many proceſſes in metallurgy. With the extraction of oils, and the preparation of wine and vinegar, they were well acquainted; and alſo with various proceſſes in the art of dying.

(14.) Sir William Jones has rendered it extremely probable, that the antient Egyptians borrowed the outlines of moſt of their Arts and Sciences from the Hindus, with whom they had an early commercial intercourſe. It is certain that the Hindus were acquainted with various metallurgic proceſſes; with metallic compounds, adapted for various purpoſes, which are not yet known in Europe; with the extraction of ſugar, the preparation of various medicines, of many vivid colours, and ſecrets in the art of dying; and with all the Chemical arts which were ſaid to have been invented by the Egyptians, apparently before the latter had acquired the rank of a civilized people.

(15.) The Chineſe appear to have practiſed many Chemical arts from the earlieſt ages. Nitre and gunpowder were long known to them, and uſed for making fire-works, before it was applied in war. They were acquainted with borax, alum, verdigris, mercurial ointments, ſulphur, and colouring matters, with the arts of dying linen and ſilk; with the preparation of varniſhes; with paper making; and the manufacture of pottery and porcelain.

(16.) The Perſians are ſaid firſt to have diſtinguiſhed the metals, then diſcovered by the names of the planets; and the Phenicians were acquainted with the making of glaſs; with the working of metals and other minerals. The celebrated Tyrian purple, extracted from a ſhell-fiſh, was a dye of which this people enjoyed an excluſive monopoly.

(17.) The Greeks received the rudiments of their knowledge in the arts and ſciences from the Egyptians, the Chaldeans, and other eaſtern nations. Among them the early Sophiſts ſeem to have turned much of their attention towards the phyſical ſciences. But their crude theories were ſo much ridiculed, and brought into ſuch diſrepute by Socrates, that phyſical enquiries ſeem to have been wholly abandoned. A few Chemical proceſſes, however, are ſaid to have been practiſed by them; and towards the decline of the Greek empire; the art of diſtillation is ſaid to have been invented by a Grecian phyſician. At firſt it conſiſted in ſaturating a fleece of wool with the vapour of the body diſtilled, which being allowed to cool, the liquor was wrung from the fleece, while another fleece was expoſed to the vapour, to be treated in a ſimilar manner. A veſſel was afterwards contrived, called an *embic*, to which the Arabians prefixed their particle *al*, from which the diſtilling apparatus, acquired the name of *Alembic*. Galen alſo ſpeaks of diſtillation *per deſcenſum*, by which the Greeks are ſaid to have extracted quick-ſilver from its ores.

(18.) The Romans, being originally an aſſociation of robbers and outlaws, which the general ſafety required to have been ſmothered in its craddle, were too intent upon wars, and the deſtruction of mankind, to cultivate the arts which might promote the comfort or embelliſhment of human life. In their arts and ſciences, they were ſervile copyiſts of the Greeks; and no Chemical diſcovery is aſcribed to them. Petronius, indeed, ſpeaks of malleable glaſs, which was preſented to Cæſar; and Pliny mentions a ſimilar fact, with regard to Tiberius. But theſe authors muſt either have been miſtaken, or the ſubſtance preſented, muſt have been very different from glaſs.

(19.) From the 3d century, and downwards, Chemiſtry was cultivated with great eagerneſs, by ſome Grecian eccleſiaſtics, and other learned men of that nation. It now aſſumed a new form, and was reſtricted in its object to the art of *making gold and ſilver*. Julius Firmicus Matarnus, who lived in the beginning of the 4th century, is the firſt who ſpeaks of this as a common purſuit in his time. It is alſo mentioned by Æneas Blaſius, in the 5th, and by Suidas, who flouriſhed in the 10th centuries.

(20.) From the Grecians, this purſuit, along with other arts and ſciences, paſſed to the Arabians, who, under the Caliphs, or immediate ſucceſſors of Mahomet, tranſlated many books from the Greek into the Arabian language. To the Greek word, the Arabians prefixed their article *al*, by which they formed the word *ALCHYMY*, or *THE CHEMISTRY*, by way of pre-eminence or diſtinction, which was uſed to denote the ſublime art of making the precious metals.

(21.) Avicenna, who flouriſhed in the 10th century, is ſaid by a diſciple of his, to have written on Alchymy. Geber, a king, and Rhaſes, a phyſician among the Arabians, with many others, are ſaid to have proſecuted this ſtudy with much ardour.

(22.) The irruption of the northern nations had involved Europe in a long night of ignorance and barbariſm. But the extenſion of the Arabian conqueſts into Spain, and other parts of Europe, together with the frenzy of the cruſades, had gradually introduced into the weſt, ſome confuſed knowledge of this, and of other arts and ſciences of the Arabians, which were long aſcribed to magic, and the operation of ſupernatural powers.

(23.) Alchymy, or the art of making gold and ſilver, began to be cultivated in Europe as early as the 9th century; and between the 11th and 15th centuries, it ſeems to have been in its moſt flouriſhing ſtate. What could induce men to devote ſo much labour and expence to a purſuit ſo utterly unprofitable, though it were attained, it is difficult now to determine. But they ſeem to have been influenced by ſome ſuch reaſoning as the following. Nature, ſaid they, aims at perfection in all her works; and as gold is the moſt perfect of all the metals, ſhe meant to have made all metals gold, had ſhe not met with obſtruction. This obſtruction they ſuppoſed to ariſe either from ſuperabundance, or defect. The ſuperabundance was aſcribed to ſome extraneous matter in the maſs, which being altered, or extinguiſhed, the remainder would be gold. Or, were a certain principle, in which the maſs was deficient, ſuperadded, the whole would become gold.

(24.) This matter which was to alter or extinguiſh the obſtructing ſuperabundance, or to ſupply the deficiency, was called *lapis philoſophorum*, or "philoſophers ſtone." This being projected upon any inferior metal, was ſuddenly to convert it into gold; or, as they ſuppoſed ſilver to be a near approach to gold, a certain proportion would make ſilver, which a new addition would change into gold. Nay, ſome aſcribed ſuch efficacy to this wonderful ſtone, that they imagined its ſlighteſt contact would convert all bodies whatever into gold. The word Chemiſtry, then, as uſed by the Alchymiſts, denoted the art of making the *philoſopher's ſtone*.

(25.) They never adverted, that, though ſuch a ſecret could have been diſcovered, inſtead of proving uſeful, it would have been highly pernicious to mankind. Gold is only valued from its ſcarcity. It poſſeſſes no intrinſic value from its utility, and is only ſubſervient to the purpoſes of ſhew and ornament. Notwithſtanding theſe obvious conſiderations, it is aſtoniſhing with what ardour alchymy was proſecuted during the dark ages. Many noblemen, and even ſovereign princes, ſold their inheritances, and reduced themſelves to beggary, in the fond hope of diſcovering the ſecret. Sovereign princes, in order to impreſs their enemies with an idea of their inexhauſtible reſources, often announced that they were poſſeſſed of it. Many became the dupes of itinerant impoſtors, who pretended to the ſecret, and only wanted large ſums to exemplify it in practice, and to inſtruct their patrons how to exerciſe the art. From the Aſiatic Reſearches, we learn, that there are perſons among the Hindus, who pretend to this ſecret, and who impoſe upon the wealthy and credulous, at this day: a proof that this extravagance, along with more uſeful arts and ſciences, had originated among the eaſtern nations.

(26.) The fortunate few, who pretended to the philoſopher's ſtone, called themſelves *adepti*, "adepts;" that is perſons who had got hold of the ſecret. Some affirmed that this art was above the reach of human capacity, and that it was made known by God, only to thoſe happy ſages whom he choſe to favour. The ſecret they pretended, they were not at liberty to reveal, as dire misfortunes would light upon that man who dared to diſcloſe it, without evident tokens of the divine approbation. The frauds committed againſt the powerful and wealthy, had produced proſcriptions againſt its profeſſors in ſeveral countries; and the clergy, not knowing that the whole was a humbug, were ever ready to launch their curſes againſt them, as perſons who made uſe of the power of infernal demons.

(27.) Theſe circumſtances induced the Alchymiſts to keep themſelves as private as poſſible. They carried on their lucubrations in vaults and cellars, under ground, to which none were admitted but their patrons; and theſe too with many ceremonies, and obligations of ſecrecy. Their opinions, their knowledge, and purſuits, they concealed with the utmoſt care; and in their communications with each other, they adopted a myſtical and metaphorical language, and employed peculiar figures and ſigns, that their writings might be underſtood by adepts only, and might be wholly unintelligible to ordinary readers. Notwithſtanding all theſe precautions, a great many Alchymical books made their appearance in the dark ages; ſome of them under the real names of their authors, but many more under feigned titles, or aſcribed to ancient ſages.

(28.) Although the object of the Alchymiſts ſeems unattainable, and would prove uſeleſs or pernicious, if attained, it cannot be denied, that, while in queſt of it, they ſometimes ſtumbled upon curious or uſeful diſcoveries. Of theſe we may mention what was called the tranſmutation of metals; improved methods of preparing ſpirit of wine, aqua fortis, vol-alkali, ſulphuric acid, gunpowder, &c. The principal alchymiſts of theſe times, whoſe writings had an influence on public taſte, and whoſe names deſerve to be recorded, were Albertus Magnus, Roger Bacon, Arnoldus de Villa Nova, Raymond Lully, and the two Iſaacs of Holland.

(29.) Though theſe authors publiſhed many things, which would do honour to a more enlightened age, they were, in general, too much tainted with the incomprehenſible jargon of the alchymiſts. The works of the latter are remarkable for nothing but obſcurity and abſurdity; and though they all pretend to know and explain the philoſopher's ſtone, their explanations are ſo enigmatical, that they cannot be underſtood, except by thoſe fortunate adepts, who, as they pretend, are illuminated from above. In thoſe benighted ages, their writings gained implicit credit, chiefly on account of their obſcurity. At laſt the ſhafts of ridicule began to attack them, and Eraſmus expoſed their frauds in his ſatire, entitled "The Alchymiſt." Men of ſound underſtanding endeavoured to ſhew the extreme difficulty, if not the impoſſibility, of their object; and the gold-makers fell into diſrepute with more rapidity than they had acquired celebrity. The invention of the art of printing, now facilitated revolutions in ſcientific opinions, and rendered it much more difficult for abſurdity to maintain her ground.

(30.) While engaged in the purſuit of the *philoſopher's stone*, an opinion had long prevailed, that a medicine might be diſcovered, which would cure all diſeaſes, and prolong human life to a very remote period, if not render man immortal. Baſil Valentine, a Monk at Erfurt, in Germany, had publiſhed his *Currus triumphalis Antimonii*, in the beginning of the 15th century, in which he celebrates the virtues of antimonial medicines; and he ſeems to have been among the firſt who applied chemiſtry to medicine. It occurred to thoſe who were in queſt of the philoſopher's ſtone, that this wonderful ſubſtance, if found, would not only convert the imperfect into a perfect metal; but would alſo remedy all the imperfections of the human frame, and convey to it the quality of indiſſolubility, and conſequent immortality. Some of their moſt elaborate preparations being tried in certain diſeaſes, with real, or perhaps, imaginary ſucceſs; mankind ruſhed headlong into this new folly, and proſecuted it with as much ardour, as they had done the one which had begun to be exploded. Chemiſtry now changed its object; and implied not only the art of *making gold*; but alſo the art of preparing the *elixir of life*, or *universal medicine*.

(31.) Preparations of opium, which had formerly been reckoned poiſonous, had been applied with ſucceſs in certain caſes. But what tended to raiſe the credit of the *univerſal medicine* to an unrivalled pitch of renown over all Europe, was Theophraſtus Paracelſus, having ſucceſsfully applied mercury in the cure of the *venerial diſeaſe*: a diſeaſe which had lately been introduced into Europe, and which had hitherto baffled every method of cure. This extraordinary man was born near Zurich, in Switzerland, in 1493, and after a variety of ſtrange adventures, in which he had acquired a high reputation, he was appointed, at the age of 34, by the magiſtrates of Baſil, to deliver lectures in their city, and was the firſt public profeſſor of chemiſtry in Europe. His arrogance was inſupportable, his bombaſt ridiculous; his whole life a complete carreer of abſurdity and debauchery, In two years, he quarrelled with the magiſtrates of Zurich, and left their city: and while oſtentatiouſly boaſting of having rendered himſelf immortal, by his *elixir vitæ*, he died in an inn, at Salzburgh, in the 47th year of his age.

(32.) His life, though irregular and extravagant in the higheſt degree, cannot be regarded as uſeleſs. He depoſed Galen with his Arabian commentators, from the chair of medicine, where they had long reigned with dictatorial authority, and gave celebrity to experiment, and a patient obſervation of nature. He raiſed chemiſtry to a renown which it did not formerly poſſeſs; and though the emptineſs and abſurdity of his philoſopher's ſtone, and univerſal medicine, were clearly manifeſted in his own perſon, yet even his wild and raſh experiments, by unhinging eſtabliſhed ſyſtems, paved the way for other experiments, founded on more accurate principles, and conducted with more caution.

(33.) Van Helmont, who was born in 1577, may be regarded as the laſt alchymiſt of any celebrity; and his death completed the diſgrace of the univerſal medicine. The celebrated Bacon Lord Verulam, though he did not make much progreſs in chemiſtry himſelf, pointed out the true road to diſcovery in this and the other phyſical ſciences, by experiment and induction. Soon after the publication of his *Novum Organum*, chemiſts applied themſelves to the patient obſervation, and accurate deſcription of facts, though they occaſionally deviated into the incomprehenſible jargon of the alchymiſts, ſo true it is that an inveterate malady cannot be removed at once. The chief of theſe were Agricola, Beguin, Glaſer, Erkern, Kunkel, Boyle, &c.

(34.) From the time of Paracelſus, chemiſtry came to be reſtricted to the art of preparing drugs; and though a few uſeful diſcoveries were made, while it was directed towards this object, its general effect may be limited to the art of preparing poiſons. Such was the effect of the prepoſſeſſions in favour of the univerſal medicine, that, to this day, moſt of the chemical chairs in Europe are occupied by medical men, and the ſcience is commonly reputed, not as of univerſal application, but as a branch of the art of medicine.

(35.) Chemiſtry did not aſſume the rank of a ſcience until it began to be cultivated by perſons who were not phyſicians, or who, at leaſt, did not devote themſelves to the labours of that profeſſion. After the overthrow of the Alchymical ſyſtem, it became a heap of rubbiſh without principles, without object or aim. The firſt perſon who arranged the facts already collected, and pointed out the proper objects of chemical enquiry, was *Becher*, in his work, entitled *Physica Subterranea*, publiſhed at Frankfort in 1669. The publication of his book forms an important era in the hiſtory of chemiſtry, as it eſcaped for ever from the trammels of Alchymy, and the foundation was laid of chemiſtry as a ſcience, in which ſtate we now find it.

(36.) Erneſt Stahl, the editor of this work, adopted the theory of his maſter; but he ſimplified and improved it ſo much, and illustrated it by ſo many new facts, that he made it entirely his own. Hence it has always been diſtinguiſhed by the name of the Stahlian Theory.

(37.) The leading feature of his Theory conſiſted in accounting for chemical phenomena, by the agency of a very ſubtil ſpecies of matter, to which he gave the name of *phlogiſton*, or principle of inflammability; and hence this is ſometimes called the Phlogiſtic Theory. For example, when a metallic earth, or calx, was brought into its reguline, or metallic form, he ſuppoſed it had imbibed a portion of phlogiſton; and when the metal was reſtored to its original earthy ſtate, he ſuppoſed that this phlogiſton had been withdrawn from it. Metals were, therefore, according to this theory, earthy bodies ſaturated with phlogiſton. Sulphuric acid was ſulphur dephlogiſticated, or deprived of the phlogiſton, which converted the acid into ſulphur—and ſo of other bodies.

(38.) In the application of this theory, new facts were daily occurring which ſeemed ſubverſive of it. It was ſoon diſcovered, that an oxyd, or calx, of a metal, was heavier than the metal, from which the ſuppoſed phlogiſton had been extracted, and that ſulphuric acid was heavier than the ſulphur formed by the ſuppoſed addition of phlogiſton.

(39.) To account for theſe, and ſimilar phenomena, the adherents of this Theory had recourſe to ſuppoſitions, at once, the moſt contradictory and extravagant. At one time, they ſuppoſed their phlogiſton to be endowed with a principle of levity, or a tendency to fly off from the centre of the earth, and hence, when ſuperadded to bodies, as in the caſes already ſtated, it rendered them lighter than they were before. At other times, they ſuppoſed this phlogiſton to be the cauſe of adheſion among the particles of matter, and to be the cauſe which impelled all bodies towards the centre of the earth. Sometimes it could paſs through the denſeſt bodies, ſuch as gold and platinum. At other times it could not penetrate even the moſt porous crucible. To ſuch abſurdities were the Stahlians reduced in applying their theory to various facts which were aſcertained, after their ſyſtem was formed.

(40.) Though the operation of *air*, had, in many caſes, been obſerved by Boyle and Hales, its influence in chemical phenomena, had long been overlooked by the Stahlians. Dr Black diſcovered the properties of a fluid reſembling air, and long called fixed air, which being combined with lime and alkalis, deprived them of cauſticity, and increaſed their weight. This diſcovery was eagerly proſecuted by Cavendiſh, Prieſtley, Bergman, Scheele, and others, who diſcovered a variety of fluids reſembling air, but differing in properties from each other, and from atmoſpheric air. Theſe airs are now commonly diſtinguiſhed by the name of gaſes, or permanently elaſtic fluids; and the inveſtigation of their properties, forms a new and moſt important branch of the ſcience, diſtinguiſhed by the name of the Ptneumatic Chemiſtry.

(41.) Dr Prieſtley and Mr Bayen, had extracted from the calces of mercury, and other metals, a more highly reſpirable ſpecies of air, than that of the atmoſphere which we breathe. But it is to the ſuperior ingenuity and acuteneſs of *M. Lavoiſier*, that we are indebted for the diſcovery, that during the proceſs of calcination, a portion of air conſtantly enters into combination with the body which is calcined. The diſcovery of this important fact, led him to doubt the exiſtence of *phlogiſton*, and to aſcribe the phenomena which Stahl had referred to the ſeparation or combination of what he called phlogiſton, to the fixation or diſengagement of air. The great number and variety of facts, which ſucceſſive diſcoveries have brought in ſupport of this doctrine, evidently point out its ſuperior claims, and prove it to be not only more fully demonſtrated than that of Stahl, but alſo to agree better with that accuracy and method which prevail in Natural Philoſophy. The exiſtence of phlogiſton never was demonſtrated, ſome ſuppoſing it to be one thing, and ſome another. But ſome aſſumed light to be the phlogiſton of which they were in queſt, and alledged that while air combined with bodies, as proved by Lavoiſier, it precipitated light which had formerly been in combination with them. But we are not certain if light be a body, *ſui generis*, and many combinations take place without any ſenſible emiſſion of light.

(42.) In ſuch caſes, it is not ſafe to extend a theory beyond the bounds of accurate experiment, or to admit the action of bodies in the production of a phenomenon, when it cannot be proved that they contribute to the effect. Thus as Chemiſtry firſt became a ſcience in the hands of Stahl, it is thought by many to have become a true ſcience in the hands of Lavoiſier. It would be highly preſumptuous to ſuppoſe that a ſcience which is yet in a ſtate of infancy, has attained the certainty of mathematical truth, yet future diſcoveries, though they ſhould change its whole theory and arrangement, will only illuſtrate and confirm what reſts upon experience and fact.

(43.) In the progreſs of Chemiſtry, each author aſſigned to the ſubſtances of which he treated ſuch names as caprice, or a falſe theory ſuggeſted. The conſequence was, that the memory was loaded with a jargon of names for the ſame ſubſtance, which had no reference to its qualities or compoſition. This defect of chemical language had been long felt, and the expediency was long perceived of inventing a new nomenclature, which might expreſs the moſt obvious qualities, or chemical compoſition of the ſubſtances treated of. This very important and neceſſary undertaking was accompliſhed by the French Chemiſts, Lavoiſier, De Morveau, Berthollet, and De Fourcroy. Though ſubſequent diſcoveries have ſhewn their nomenclature to be deficient in ſome reſpects, it may be regarded on the whole as a great improvement, as it facilitates the progreſs and communication of the ſcience.

(44.) In the preceding hiſtory, we have confined ourſelves to a rapid ſketch of the riſe and progreſs of Chemiſtry; and reſerved a more minute account of the ſeveral diſcoveries that have been made, and of the perſons who made theſe diſcoveries, to be inſerted in the enſuing view of the preſent ſtate of Chemiſtry. Sir Iſaac Newton's diſcovery of the true ſyſtem of the univerſe, long attracted the attention of our philoſophers toward mathematical and aſtronomical enquiries; while the French cultivated Chemiſtry as a ſcience peculiarly their own. Within theſe 50 years this ſcience has been cultivated with much ardour, in almoſt every country of Europe. Diſcoveries are accumulating with ſo much rapidity, that it is hardly poſſible for any general treatiſe, to keep pace with theſe diſcoveries, and to exhibit the actual ſtate of the Science. But we propoſe to exhibit not only the ſtate of the ſcience; but its application to the mineral, vegetable, and animal kingdoms; and its uſes in arts and manufactures.

SECT. III. *Of the* FIRST PRINCIPLES *of* BODIES, *and* OBJECTS *of* CHEMISTRY.

(45.) ARISTOTLE, and other antient philoſophers, imagined that all bodies conſiſted of four principles, or elements, earth, water, air, fire. But commmon air and water have been proved to be compound, not ſimple bodies. Of earths, there are ſeveral varieties, poſſeſſing diſcriminating properties; and of the nature of fire, we are totally ignorant. Perhaps there may be only one, or at moſt two genera of matter; and all its phenomena may be owing to different degrees of condenſation of its particles, or to certain imperceptible motions, which may occaſion its minuter parts to radiate, or to fly off from the general maſs. But conjectures concerning the ultimate elements of bodies, are of no uſe in chemiſtry, as this ſcience aſſumes all bodies to be elementary, which cannot be farther decompoſed. Should bodies, which are now eſteemed elementary, or *ſimple ſubſtances*, be afterwards proved to be compounds, which is likely to be the caſe with many of them, they will then change their claſs, and be transferred from the liſt of *ſimple*, to that of *compound* bodies.

46. Chemiſtry, therefore, naturally divides itſelf into two great branches. 1. To inveſtigate the properties of ſimple bodies. 2. To detail the properties of compound bodies; or of thoſe which are formed by the union of two or more ſimple bodies with each other. It will alſo be deſirable to introduce the conſideration of each of theſe bodies, in the order of its importance as a chemical agent.

(47.) The alchemiſts adopted a diviſion of what they eſteemed to be ſimple bodies, which was ſuited to their peculiar views. The elements of of all bodies, according to their theory, were *ſalt*, *ſulphur*, and *mercury;* and theſe were long known among them by the appellation of the *tria prima*. Paracelſus added two more to their number of ſimple bodies. According to him, *ſalt* included every thing that was ſoluble, and ſapid. Volatile ſubſtances, which fly off without burning, were called *mercury* or *ſpirit*. What was liquid and inſipid, was called *phlegm*, or *water;* what remained dry, fixed, and inſoluble, was called *earth*, or *caput mortuum*. The two laſt elements of Paracelſus, are the water and earth of the antients. The alchemiſts ſuppoſed that all bodies might be decompoſed by fire, and reduced to their original elements. The mercury, during combuſtion, eſcapes in the form of ſmoke; the ſulphur eſcapes in flame; and the ſalt, or fixed principle, remains behind.

(48.) Beccher, whom we have quoted as the founder of chemical ſcience, generalized and ſimplified ſtill more the chemical facts which were then known. He ſuppoſed all bodies to conſiſt of earth and water; the firſt including every thing that was dry, the laſt every thing humid. He admitted three earthy principles, namely fuſible earth, inflammable earth, and mercurial earth. The firſt was the principle of dryneſs, of fuſibility, and hardneſs. The fuſible earth, combined with water, formed an acid called the *univerſal acid*, becauſe all other acids derived their properties from it. The inflammable earth was conſidered as the principle of combuſtibility, and the mercurial earth of volatility. The fuſible and mercurial earths, with water, compoſe common ſalt; and the inflammable earth, with the univerſal acid forms ſulphur. The metals were compoſed of theſe three earths in equal proportions. When the mercurial earth was in ſmall proportion, the compound was *ſtone;* and when the fuſible earth was in great proportion, the compound was the *precious ſtones*. When inflammable earth was in the greateſt, and fuſible in the ſmalleſt proportion, colorific earths were the reſult.

(49.) Stahl, the pupil of Beccher, changed and ſimplified this theory. In place of the inflammable earth, he ſubſtituted the principle of inflammability, or fixed fire, which he diſtinguiſhed by the name of *phlogiſton*. He retained the univerſal acid, but rejected the mercurial earth. His elements, therefore, amounted to five, *air*, *water*, *phlogiſton*, *earth*, and *univerſal acid*.

(50.) It was thought neceſſary to ſtate theſe former theories concerning ſimple, or elementary bodies, in order that the preſent might be compared with the former ſtate of chemiſtry. Were we acquainted with the ultimate elements of bodies, and with all the combinations of which they were capable; chemiſtry would attain its higheſt poſſible ſtate of perfection. But as the ultimate elements of bodies, ſeem to be beyond the reach of our knowledge, we are not entitled to aſſume as elementary bodies, any but ſuch as cannot be farther decompoſed; and although many bodies may be eſteemed ſimple, which in reality are compounds, no error will reſult from holding them to be ſimple, until their compoſition can be demonſtrated.

(51.) There are two methods by which we arrive at a knowledge of the properties of bodies. Theſe are *analyſis* and *ſyntheſis*. By analyſis, or decompoſition, the different ſimple ſubſtances of which compound bodies conſiſt, are ſeparated, and their properties individually examined. Thus, to adduce a very familiar example, ſuppoſe the compound to be water and ſugar, the water can be ſeparated by diſtillation, and each of the bodies may be obtained, and its properties examined, apart from the other.

(52.) Different modes of analyſis have been deſcribed by chemical writers, and they have been reduced to the *dry* and the *liquid* analyſis. Some minerals, and all animal and vegetable matters, when deprived of life, and placed in favourable circumſtances, ſlowly ſeparate into their component parts; and the principles of which ſome liquids are compoſed, re-act upon each other, and ſpontaneouſly ſeparate, which affords an opportunity of examining the nature of theſe ſubſtances. This is diſtinguiſhed by the name of the *ſpontaneous analyſis*.

(53.) The *dry* analyſis, or that by fire, operates by the accumulation of caloric in bodies, which cauſes their particles to ſeparate, and favours the examination of their component parts. But it will be ſeen that different quantities of caloric accumulated in bodies, produce different reſults, and change the order of decompoſition; ſo that this inſtrument of analyſis requires to be uſed with much prudence.

(54.) The *liquid* analyſis, or that by re-agents, is conducted by mixing the compound body, which is to be examined, with various ſubſtances, which have the power of ſeparating its conſtituent parts. It is here that the genius and ſcience of the chemiſt are rendered moſt conſpicuous; becauſe every product of nature and art may become an inſtrument in his hand, for aſcertaining the nature and properties of the ſubſtances under examination. Of ſuch importance and utility, are accuracy in aſcertaining the component parts of bodies, that chemiſtry has been often called the ſcience of analyſis.

(55.) Syntheſis, or compoſition, is the reverſe of analyſis. It conſiſts in uniting two or more ſimple bodies into one compound, whoſe properties generally differ from thoſe of the bodies which make up the compound. When a body has been analyſed into its component parts, if by the reunion of theſe parts we reproduce the original compound, it affords a deciſive proof that the analyſis has been accurately conducted. Thus, if we find by analyſis, that oxyd of quikſilver is compoſed of the metal and pure air, or oxygenous gas, the concluſion is rendered abſolutely certain when we can, by recombining this air with the quickſilver, re-produce the original oxyd. This is called confirming analyſis by ſyntheſis; and was, by the older chemiſts, diſtinguiſhed by the name of *experimentum crucis*.

(56.) In all caſes of complicated analyſis, we only arrive at the concluſion by various intermediate ſteps of ſyntheſis, or new compoſitions. Hence chemiſtry may as properly be called the ſcience of ſyntheſis, as that of analyſis, as it conſiſts in a knowledge of the reciprocal action of bodies upon each other in every given caſe. By ſyntheſis, a great many compound bodies are formed, which are uſeful in the arts, and neceſſary to our wants. There are many bodies which have not yet been decompoſed, and their properties can only be fully known by combining them with other bodies, and examining the nature of the compounds thus produced.

(57.) However various and complicated the operations of chemiſtry, however numerous and different the reſults which are obtained, they are all reducible to analyſis or ſyntheſis; the reſults are either decompoſitions or combinations; and to theſe two proceſſes, all our operations are limited.

(58.) Before entering upon the conſideration of ſimple and compound bodies, it may be proper to offer a few remarks upon the law which regulates the compoſition and decompoſition of bodies.

SECT. IV. AFFINITY.

(59.) To the law by which matter is made to approach to, and to unite with matter, Sir Iſaac Newton aſſigned the name of *attraction*. It was not his intention to aſſign the cauſe of this phenomenon, but merely to note a fact whoſe cauſe was unknown. To diſtinguiſh chemical from other kinds of attraction, Bergman prefixed the word *elective*, indicating that certain bodies mutually attracted each other by a ſort of election, or choice. Dr Hooke firſt applied the word *affinity* to indicate chemical attraction, which is an improper word, as it aſſumes a ſimilarity, or identity of properties between bodies which have a tendency to combine. We are not, for example, able to trace any ſimilarity between oxygenous gas and ſulphur, whoſe combination forms ſulphuric acid; nor between the ſame gas and a metal, whoſe union forms an oxyde. But as the term *affinity* was early adopted by the French, it is now generally received by the chemiſts, and has ſuperſeded the word *attraction* when applied to chemical combinations. No harm can ariſe from the uſe of this or any other word, provided we diveſt ourſelves of the erroneous theory which gave riſe to it, and apply it only to denote a fact, and not the unknown cauſe of that fact. The notion which gave riſe to the uſe of the word *affinity*, was, that bodies whoſe particles were ſimilar in form coaleſced, and united with each other, while thoſe whoſe particles were diſſimilar, had no tendency to unite. Others ſuppoſed that the particles of the ſolvent were in the form of ſharp points, or wedges, which entered mechanically into the interſtices of the ſolvend, deſtroyed the adheſion among the particles of the latter, and reduced the whole to a homogenious maſs. Stahl firſt pointed out the abſurdity of this theory; and it is too childiſh to deſerve mention, were it not to guard againſt its admiſſion when the word *affinity* is uſed.

(60.) Sir Iſaac Newton has demonſtrated it to be an univerſal law of nature, that all matter attracts and is attracted by matter. The ſun and planets mutually attract, and are attracted by each other, and by other ſuns, and other planets. Sir Iſaac has demonſtrated that this univerſal law is the ſame in kind with *gravitation*, or the force which cauſes a heavy body, when unſupported, to fall to the ground. This attraction not only takes place between the different planets, but between all the component parts of the ſame planet. It does not operate in the ratio of the bulk, or ſize, of bodies; but of their quantities of matter. No diſtance between bodies can be aſſigned to which it does not extend; and the ſtrength of this attraction decreaſes in the ratio of the ſquares of the diſtances between the attracting bodies.

(61.) When two bodies are brought within a certain diſtance of each other, they adhere with conſiderable force. Thus two poliſhed pieces of marble or glaſs, or the poliſhed ſurfaces of two balls of lead, and many other bodies which it is unneceſſary to mention, when brought cloſe to each other, adhere with great force. It has been proved that this adheſion is not produced by the preſſure of the atmoſphere, becauſe it operates in vacuo as well as in the open air. When a rod of metal, or almoſt any other body, is plunged into water, and drawn out again, part of the water adheres to it. When gold is plunged into mercury, part of the mercury adheres, and conveys to the gold a white colour. The ſame may be illuſtrated by a great variety of other examples; and hence there is evidently a force which impels theſe bodies towards each other, and keeps them together. To this force has been aſſigned the name of the *attraction of adheſion*.

(62.) We alſo obſerve that the particles of all homogenious bodies are united together with various degrees of force. Thus the particles of water, and of all liquids, attract each other with a certain degree of force, which cauſes their drops to aſſume a globular form. The attraction between the particles of ſolid bodies is commonly greater than that between the particles of fluids, and it requires a greater force to overcome the latter than the former. This attraction between the particles of the ſame body, has been diſtinguiſhed by the names of *coheſion*, the *attraction of aggregation*, and *homogeneous affinity*.

(63.) But when the particles of diſſimilar ſubſtances combine together, muriatic acid and marble for inſtance, the force which unites them is called the *attraction of compoſition, heterogeneous affinity;* or, more ſtrictly, *chemical affinity*.

(64.) Theſe attractions were attempted to be accounted for, by the intervention of a ſubtil fluid, which fills all ſpace, ſomewhat ſimilar to the vortices of Des Cartes. It was aſſumed as a firſt principle, that a body cannot act where it is not; and as we ſee the attraction of gravitation to operate upon bodies ſituated at immenſe diſtances from each other, for example, on the ſun and earth, it was ſuppoſed that bodies were mutually impelled towards each other, by currents of this extremely ſubtil matter. But the exiſtence of ſuch ſubtil matter is a mere aſſumption, without proof; and though its exiſtence were admitted, it is not capable of producing the phenomena. The only ſpecies of attraction, known to us, where a ſubtil matter is preſent, is that of electricity, and perhaps, that of magnetiſm. The electric attraction does not operate according to the law of gravitation; and the attracted body, if inſulated, is firſt attracted, and then repelled. It ſeems to be produced by the elaſticity of the electric fluid, when accumulated in a certain ſpot, which urges it to expand, and to reſtore the equilibrium. This expanſive power cauſes a regurgitation in the path of the attracted body; which, when it has become electrified, is again repelled by the ſame expanſive power, until its electricity be diſcharged.

(65.) Whether the attractions of gravitation, of adheſion, and of affinity be produced by the ſame, or by different forces acting in nature, we have no means of knowing; but it is moſt conſiſtent with the ſimplicity of her operations to ſuppoſe that they are all produced by the ſame cauſe. The only difference is, that gravitation makes bodies approach each other, which are ſituated at great diſtances: while the other attractions unite bodies whoſe diſtances are ſo ſmall, that they eſcape the notice of our ſenſes, and defy our powers of calculation.

(66.) It is as difficult to account for the action of bodies upon each other when they are in contact, as when they are at a diſtance from each other. But though the particles of matter ſhould be ſo near each other that we cannot diſcern their diſtance, and we may be apt to pronounce them in contact, there ſeems to be no ſuch thing in nature as the actual contact of one particle of matter with another. Gold, which is among the denſeſt bodies known to us, when viewed through a microſcope, is ſeen to be very porous; and the Medicean Academicians ſucceeded in ſqueezing water through a ball of this metal. All bodies have their bulk diminiſhed by cold, and the more the cold is increaſed, the more they are diminiſhed, which would be impoſſible, were their particles in contact before the cold was applied. The bulk of many bodies is diminiſhed by preſſure, or by percuſſion, which is only repeated preſſure; and the diminution of bulk is proportional to the preſſure. Newton found it required a preſſure of many pounds to bring two pieces of glaſs within the 8ooth part of an inch of each other, and a much greater force to diminiſh that diſtance; but that no force was capable of diminiſhing the diſtance beyond a certain limit. Boſcovich has proved that a moving body communicates part of its motion to another body, before it actually reaches it. Hence when bodies act upon each other, even by impulſion, or preſſure, they do not actually come in contact; and the motion which reſults, is as much produced by bodies acting where they are not, as the motion of the moon towards the earth.

(67.) It ſeems evident then, that the attractions of adheſion, coheſion, and affinity, operate beyond the ſphere of the bodies and particles attracting, as the attraction of gravitation operates upon bodies ſituated at the remoteſt diſtances. Theſe attractions cannot be produced by currents of ſubtil matter, becauſe, were this the caſe, every particle of matter muſt have its current, extending to immeaſurable diſtances, and the attraction would be equally ſtrong at all diſtances; which is known not to be the caſe with gravitation, and the other attractions ſeem to increaſe in ſtrength as the diſtance of the attracting bodies is diminiſhed.

(68.) As this attracting power operates upon all matter, not only in maſs, but upon each individual particle of the maſs, its effect would be to bring all the matter of the univerſe towards a common centre; were it not counteracted by another force, viz: the centrifugal power produced by motion. We can account for this attraction in no other way than by ſuppoſing that it was a law impreſſed upon matter by its almighty author, which operates in a way that will ever exceed our comprehenſion. Or, as this attracting power is the main ſpring of the whole material ſyſtem, we cannot be far wrong though we ſhould aſcribe it to the conſtant energy of the ſupreme being, acting by wiſe and invariable rules.

(69.) Morveau, in the year 1773, diſcovered a remarkable coincidence between the attraction of coheſion, and that of affinity. He procured circular plates of the different metals, of equal thickneſs, an inch in diameter, and well poliſhed. Each had a ſmall ring in the centre, by which it was ſuſpended parallel to the horizon, from the arm of a nice balance, and exactly counterpoiſed by weights in the oppoſite ſcale. Thus balanced, each plate was ſucceſſively ſlid over the ſurface of mercury in a cup, ſo as to exclude the air, as practiſed in ſilvering mirrors. Weights were then added to the oppoſite ſcale until the adheſion between the plate and the mercury was overcome. Freſh mercury was employed in each experiment. In this way he found that

	Grains
Gold adheres to mercury with a force equal to - - -	446
Silver - - -	419
Tin - - - -	418
Lead - - -	397
Biſmuth - - -	372
Zinc - - - -	204
Copper - - -	142
Antimony - - -	126
Iron - - - -	115
Cobalt - - -	8

Theſe remarkable differences in the force of adheſion of different metals to mercury, could not be owing to the preſſure of the atmoſphere, which was the ſame in all. Nor could they be owing to the different denſities of the adhering metals, for cobalt is denſer than zinc, and iron more ſo than tin. They are therefore owing to the different degrees of chemical affinity between theſe metals and mercury, and they follow the order of the ſolubility of theſe metals in mercury. Iron and cobalt, which mercury does not diſſolve, are at the bottom of the liſt. Hence the affinity, or tendency of gold, ſilver, tin, &c. to combine with mercury, may be expreſſed by the numbers 446, 429, 418, &c.

(70.) Mr Archard of Berlin, in 1780, publiſhed the reſult of experiments, made with a view to aſcertain the adheſion of various ſolid bodies, to various fluids. He aſcertained that the adheſion was not affected by variations in the preſſure of the atmoſphere; but that it was diminiſhed by an increaſe of temperature in the bodies adhering. In all caſes, the adheſion of the ſame bodies was found to depend upon the number of points which came in contact; and increaſe of heat, by expanding the bodies, left fewer points to come in contact, in the ſame ſpace. He even proceeded to conſtruct tables of the adheſion of ſolid to fluid bodies, which might alſo ſerve as tables of affinity between theſe ſubſtances; but it muſt be obſerved, that many more experiments and obſervations are neceſſary, to render theſe tables of uſe in chemiſtry.

(71.) The attraction of coheſion, or homogenious affinity, ſeems to be of the ſame nature with the general law of attraction. Muſchenbroeck aſcertained the adheſive force of various ſolid bodies, by ſuſpending weights to rods of theſe bodies, an inch ſquare, in a perpendicular poſition. The number of pounds averdupois, neceſſary to rupture a rod, was held to be the meaſure of its coheſion. It does not appear that the coheſion of ſolids is in the ratio of their denſity, or cloſeneſs of their particles; for ſteel-bar was 135,000 lb. while caſt gold was 22,000. Caſt tin was 4,440 while caſt lead was only 860. It is probable that the fibrous, or filamentous, ſtructure of bodies increaſes their adheſion, if the diſrupting force acts in the direction of the filaments, and diminiſhes it, if the force act contrary to the their direction.

(72.) When two bodies are to be combined, a liquid with a ſolid for example, it is evident that the attraction of coheſion, or of aggregation, in each of the bodies, ſerves to counteract their affinity, or the attraction of combination. Thus, if muriatic acid be poured upon a piece of marble, there are two forces to be overcome, before theſe bodies can unite with each other: 1. the attraction of the particles of the acid for each other; 2. the attraction, or coheſion, between the particles of the marble. The force with which the acid and marble unite, may be conſidered as the exceſs of the attraction of affinity or compoſition, over the ſum of theſe oppoſing attractions of coheſion. It hence follows that many bodies which have an affinity for each other, will not unite, unleſs they be preſented in very minute particles, or have their adheſive force impaired by the expanſive power of heat.

(73.) Upon theſe principles, the phenomena of ſolution and precipitation are explained. Thus the particles of ſome ſolid bodies have a ſmaller degree of attraction for each other, than for the particles of certain fluids, and vice verſa; and conſequently when theſe are applied to each other, the particles of the ſolid ſeparate, and combine with thoſe of the fluid, producing a chemical mixture, or *ſolution*. But the ſeparation of the particles of the ſolid can only take place while the particles of the fluid are in the ſphere of their attraction; and when the attraction of the particles of the mixture thus formed, becomes equal to the attraction of the particles of the ſolid for each other, no farther ſolution takes place, and the fluid is ſaid to be *ſaturated*. If into this mixture another ſolid, or fluid, be introduced, whoſe particles have a ſtronger attraction for the ſolvent fluid than they for the ſolid, the fluid will leave the former ſolid, and combine with the particles of the latter. Thus, if potaſh be introduced into a ſolution of marble in marine acid, the acid will leave the marble and combine with the potaſh; or if ſpirit of wine be poured into a ſolution of ſalt in water, the water will quit the ſalt, and combine with the ſpirit. A fluid uſed to diſſolve a ſolid is called the *ſolvent*, and the ſolid the *ſolvend*. When a body is thrown out of ſolution by the application of a third body, for which the ſolvent has a ſtronger attraction, it is ſaid to be *precipitated*, and the body is called a *precipitate*, becauſe it commonly falls to the bottom; though it ſometimes riſes to the ſurface, or remains ſuſpended in the liquor.

(74.) Subſtances which are diſſolved may be obtained again, not only by precipitation, but alſo by abſtracting the whole, or part of the fluid in which they are diſſolved. This is done by *evaporation*, in conſequence of the application of heat When the evaporation is ſlowly conducted, the ſolid bodies obtained from it are generally preſented under ſome regular ſhape, denominated cryſtals. It ſeems to be a general law, that when bodies paſs very ſlowly from a fluid to a ſolid ſtate, whether by heat or liquid ſolution, their parts aſſume ſome determinate form, or ſtructure, which is peculiar to each body. This is ſuppoſed to be produced by the attraction of aggregation, or coheſion, operating upon the particles of the body, and ſlowly arranging them again into a ſolid form. But when a ſolid is produced by precipitation, or by the ſudden evaporation of the ſolvent, the fluid is ſuddenly removed from betwixt the particles of the ſolid, and they are left beyond the ſphere of each others attraction. The ſolid thus formed, is a confuſed maſs, without any of that regularity of form which would have reſulted from the gradual approach of the particles to each other, and the ſlow operation of the attraction of aggregation.

(75.) Some bodies are very ſoluble in hot water, but are diſſolved in ſmall proportion in cold water. Hence if a ſaturated ſolution of ſuch bodies in hot water, be made to cool very ſlowly, the particles of the ſolid will gradually approach each other as the heat is abſtracted, and the attraction of aggregation will arrange the particles into regular forms. This is called the cryſtallization of ſalts. Such ſalts as diſſolve in nearly equal quantities in cold as in hot water, can only be cryſtallized by the very ſlow evaporation; and ſuch as diſſolve in much greater quantity in hot than in cold water, cryſtallize moſt readily by very ſlow cooling. In all caſes the cryſtals of the ſame ſalt affect the ſame form, unleſs particular circumſtances occaſion a variation.

(76.) When bodies are fuſed by heat, and reconſolidated in conſequence of very ſlow cooling, they aſſume regular forms, as well as when they conſolidate from liquid ſolution. Thus, when liquid glaſs is left in the pots, and the furnace is allowed to cool very ſlowly, the glaſs is found in a cryſtallized form. Sir James Hall found that baſaltic ſtones, when melted into glaſs, and made to cool very ſlowly, were reſtored to their ſtony ſtate; that is, they were no longer homogeneous like glaſs; but exhibited ſuch concretions and cryſtallizations as conſtitute ſtones. It is probable that all ſtones, and indeed all ſolid bodies that can be melted by heat, aſſume a peculiar ſtructure, or texture of parts, when they ſlowly conſolidate from heat, though we are not always able to cool them with that degree of ſlowneſs, which would make them aſſume regular external forms. But iron, and various metals, have been preſented in regular forms, or cryſtallized in this way. In ſuch caſes, the particles of the bodies are ſeparated, and rendered fluid by means of caloric interpoſed betwixt them; and the more ſlowly the caloric is extricated from them, the more regularly does the attraction of coheſion operate, and the more perfect the cryſtallization.

(77.) To account for theſe phenomena, it is ſuppoſed, that when the attraction between the particles of a body and its ſolvent, or caloric when it is fuſed by heat, is diminiſhed, the attraction of adheſion between the particles themſelves is increaſed; theſe two forces acting in oppoſition to each other. It is ſuppoſed that the ultimate molecules of every body, poſſeſs ſome preciſe geometrical form, by the regular application of a great number of which to each other, a maſs is formed, poſſeſſing a regular external figure. That when the proceſs of conſolidation is allowed to go on very ſlowly, theſe figured molecules always apply their ſurfaces or edges to each other in a particular way, and thus, the maſs which is made up of the regular application of theſe ſubordinate figures to each other, is always, in the ſame body, of the ſame form.

(78.) But we know nothing of the figure of the particles of matter; and though a cube may be made up of parts which are cubical, a pyramid of parts which are pyramidal, &c. yet as far as our ſenſes can judge, even though they be aided by microſcopes, a cube or pyramid may be made up of particles that are globular, or of any other figure. The extreme minuteneſs of the particles of matter will ever prevent us from diſcerning whether a cryſtal be made up of parts which are ſimilar, or diſſimilar to the whole. It was already ſtated, that there is ſtrong reaſon to believe that the particles of matter, even in the denſeſt bodies never come into actual contact. Of courſe there can be no occaſion for the application of ſimilar ſurfaces to each other, or of ſimilar figures, to enable the attraction of coheſion to complete a maſs of a regular form. As the particles are kept at a certain diſtance from each other, the maſs may appear to us perfectly regular, though the particles of which it is compoſed ſhould be of all poſſible figures. The motion of the particles of fluids over each other, would lead us to infer that the ultimate figure of all the particles of matter is globular; and from the coheſion of ſuch particles any figures may be conſtructed, in which our ſenſes cannot diſcover any irregularity.

(79.) But the Abbé Hauy has diſcovered, that in cryſtals there is what he calls a *primitive form*, or *nucleus*, which may be found by careful mechanical diviſion. This may be regarded as the firſt formation of the coheſive attraction, and the center round which the other parts of the cryſtal form, or ramify. But the inference ſeems altogether gratuitous, that this, or any other parts of the cryſtal, are made up of particles of a ſimilar figure. As well might we aſſert that a man's hand, or the leaf of a tree, are made up of particles which are ſimilar to the whole.

(80.) He found that all the primitive forms of cryſtals which he had obſerved, might be reduced to ſix; namely,

1. The parallelopiped.
2. The tetrahedron.
3. The octahedron.
4. The regular ſix ſided priſm.
5. The dodecahedron, terminated by equal rhombs.
6. The dodecahedron, with triangular faces, compoſed of two pyramids, united baſe to baſe.

He has alſo found that theſe primitive forms may be reduced to the three following figures, which, without ſufficient apparent reaſon, he aſſumes to be the figures of the integrant particles of which all cryſtals are compoſed. Theſe are,

1. Tetrahedron, or the ſimpleſt of all pyramids.
2. The triangular priſm, or the ſimpleſt of all the priſms.
3. The parallelopiped, or the ſimpleſt of the ſolids, which have their faces parallel.

(81.) He ſuppoſes, that in forming cryſtals, the integrant particles ſometimes unite by their faces, and ſometimes by their edges, and thus he accounts for the different figures of the primitive cryſtals, when they are made up of particles of the ſame form. Variations from the uſual form, are called by Hauy *ſecondary forms*. But it appears to us that the ſame body, in ſimilar circumſtances, always forms cryſtals of the ſame figure. Thus common ſalt, ſlowly cryſtallized, forms cubes; but if cryſtallized with more rapidity, the cryſtals reſemble pavilion roofs: which can eaſily be accounted for from the more rapid eſcape of the water of ſolution in the laſt, than in the former caſe. See CRYSTALLIZATION.

(82.) Having thus explained in what reſpects the attraction called affinity, differs from thoſe of adheſion, and coheſion, it may now be obſerved that a great part of chemiſtry conſiſts in noting the affinity, or chemical action, of bodies on each other. As the reſults of this action are conſtant and uniform, they have been divided into certain claſſes, and have been characterized by the name of *laws of chemical affinity*. The celebrated Fourcroy has arranged the facts relating to chemical affinity under ten different heads, which he has denominated the *laws of affinity*. A few remarks on theſe ſhall conclude this ſection.

FIRST LAW.

Chemical affinity takes place only between bodies of a different nature.

(83.) In this reſpect, it differs from the attraction of coheſion, which operates only on homogeneous bodies, as water on water, or mercury on mercury. But muriatic acid and ſoda, for example, have no apparent ſimilarity to each other, yet when brought in contact, they unite, forming common ſalt. The compound thus formed, differing from each of its ingredients, ſhews that the former have entered into an intimate union, called chemical affinity.

(84.) Chemical affinity may either take place between two ſimple bodies, as in the caſe juſt alluded to, or between two compound bodies, the reſult of which will be a change in the order of compoſition. Theſe caſes were formerly diſtinguiſhed by the name of *ſingle* and *double elective attractions*; but are now known by the name of *ſingle* and *double affinities*. Thus muriate of barytes is compoſed of muriatic acid, and a particular earth, and ſulphate of potaſh, of ſulphuric acid, and alkaline ſalt. If theſe two compound bodies be added together in ſolution, the barytes will quit the muriatic acid, and combine with the ſulphuric, with which it will go to the bottom; while the muriatic acid will combine with the potaſh. Thus two new compounds will be formed, differing from thoſe which previouſly exiſted, viz: ſulphate of barytes, and muriate of potaſh.

(85.) That all bodies, were they reduced to ſuch a ſtate, that their particles could unite with each other, have a mutual chemical affinity, has been aſſerted by ſome, but has not been proved. One thing is certain, that ſome bodies have a ſtronger affinity with particular bodies than others: and the different degrees or forces of affinity between bodies, it is one great object of chemiſtry to aſcertain. Thus, in the caſe alluded to, barytes has a much ſtronger affinity to ſulphuric acid than potaſh, as the barytes abſtracts this acid from potaſh. The degrees of affinity between the ſame bodies, are, like gravitation, in the ratio of the attracting matter. Thus, a large quantity of ſulphuric acid will hold a ſmall quantity of water, with much greater force than a ſmaller quantity of the acid will hold the ſame water. When affinities counteract each other, called *divellent affinities*, the effect is a middle term between their ſeveral forces. Thus lime does not abſtract all the carbonic acid from potaſh.

(86.) M. Berthollet aſcertained this fact by ſome very curious experiments. Having mixed equal quantities of pure potaſh, and ſulphate of barytes, he boiled them together ſome time in a ſmall quantity of water. According to the views of former chemiſts, the ſulphuric acid having a ſtronger affinity for barytes than for potaſh, no decompoſition ſhould have taken place. But it was found that the ſulphate of barytes was decompoſed by the potaſh, and that the acid was divided between the two baſes. In the ſame manner oxalate of lime, and phoſphate of lime; the firſt compoſed of oxalic acid and lime, the ſecond of phoſphoric acid and lime, for which, both of theſe acids have a ſtronger affinity than for potaſh; were partially decompoſed by boiling them with potaſh.

(87.) From theſe experiments he concluded that the acids may be ſeparated from baſes for which they are ſuppoſed to have the ſtrongeſt affinity, and made to combine with baſes for which they have a weaker affinity. If a ſmall quantity of the decompoſing ſubſtance had been employed, the effect would not have been perceptible. But if the ſulphate of barytes, for inſtance, had been treated with ſucceſſive portions of potaſh, it would have been entirely, or almoſt entirely, decompoſed: the quantity of the decompoſing ſubſtance, as in caſe of ſulphuric acid and water, compenſating for its weaker affinity. Thus it appears, that, as in the caſe ſtated reſpecting lime and the carbonate of potaſh, when one body is acted upon by two others, for each of which it has different degrees of affinity, it divides itſelf betwixt the *divellent* bodies, in a ratio, compounded of their different degrees of affinity; but, if the quantity of the body which has the weakeſt affinity, be increaſed ſo as to compenſate this defect, it will attract the whole, or greateſt part of the third body to itſelf.

SECOND LAW.

Chemical affinity takes place only between the ultimate particles of bodies.

(88.) As we do not know any thing about the ultimate particles of bodies, this law might have been ſpared; and it ſeems to be included in the fourth law, about to be explained. Thoſe who aſcribe affinity to a ſimilarity in the particles of uniting bodies, which allows them to come within the ſphere of each others attraction; and the want of affinity, as between water and oil, to a diſſimilarity in the figure of the particles of theſe bodies, which keeps them beyond the ſphere of each others attraction, ſeem to reaſon upon an aſſumption unſupported by proof. We have already hinted, that, if we can reaſon from analogy, concerning the ultimate particles of bodies, they muſt appear to be all globular. There does not ſeem to be a want of affinity between water and oil, but each body attracts itſelf more ſtrongly than it does the other. If the coheſion of the particles of either body be impaired, and their ſeparation effected, by the intervention of an alkali, as in the manufacture of ſoap, oil is found to have a certain degree of chemical affinity with water. We have already obſerved, that the coheſion of homogeneous bodies counteracts, and, in many caſes, overcomes their affinity, or tendency to unite with diſſimilar bodies.

THIRD LAW.

Chemical affinity takes place between ſeveral bodies.

(89.) It was a maxim among the older chemiſts, that only two, or at moſt three bodies, could be united by chemical affinity. Thus the alkaline ſalts, which they called perfect neutrals, were quoted as examples of two ſimple bodies united by affinity, with which a third body could not be made to combine. But if we take ſulphate of potaſh as an example, we ſhall find it compoſed of an acid, formed by the union of oxygen and ſulphur. The alkaline baſis, or potaſh, is ſtill reckoned a ſimple, but is more probably a compound body.

The ſalt contains water of cryſtallization, which is compounded of oxygen and hydrogen. Thus, a body which they ſuppoſed to be compounded of only two ſimple bodies, is found to contain five different bodies, united by diſtinct affinities, each of which may be ſeparated from the others. But taking the acids for ſimple bodies, alum, a well known ſalt, is found to be compounded of three ſubſtances which enter into chemical union, viz: ſulphuric acid, alumina or pure clay, and potaſh. This is an example of what are called triple ſalts, of which the varieties will be explained in their proper place, conſiſting of three ſubſtances combined in one compound. But the mixture of metals, whoſe fuſion requires a pretty high temperature, exhibits more ſtriking examples of a variety of bodies being combined by affinity. Thus certain proportions of biſmuth, lead, and tin, form a compound which melts at the temperature of boiling water, proving by this change of properties, that a chemical union had been effected.

Fourth Law.

That chemical affinity may take place between two bodies, it is neceſſary that one of them be in the liquid or fluid ſtate.

(90.) We have already obſerved, that the force of affinity of the bodies for each other, muſt be greater than the coheſion of the particles of each body among themſelves, as in the caſe of marble and muriatic acid, or no chemical union will take place. The gaſeous is generally diſtinguiſhed from the fluid ſtate of bodies, and it might have been here expreſſed, that one of the bodies muſt be either in the fluid or gaſeous ſtate. Thus muriatic acid, paſſes from the gaſeous ſtate, into combination with water, and carbonic acid into combination with lime.

(91.) The particles of a body, diſſolved in a fluid, if not in their ultimate, are at leaſt in a very minute ſtate of diviſion, by which the points of contact between them and the particles of the ſolvent are greatly multiplied. The conſequence is, that the two bodies, after their union, appear homogenious, or to be only one body; and if the product be ſoluble in water, it is endowed with a degree of tranſparency, which is a teſt of perfect ſolution. Of this, we have examples in the ſolutions of ſugar and of common ſalt in water. We have another example in the proceſs of making glaſs, where the alkali is firſt melted by heat, and in the ſtate of fuſion, combines with the ſand or ſilicious earth, forming a homogeneous and tranſparant compound.

(92.) If the product, formed by uniting a liquid with a ſolid body, be itſelf inſoluble, or nearly inſoluble in water, the farther combination will be retarded, or wholly reſiſted, by the coating thrown round the ſolid, in conſequence of the firſt combination. Of this, we have an example in the combination of the ſulphuric acid with lime, or with ponderous earth. If in combining a fluid with a ſolid another fluid already in union with the ſolid be diſengaged, the affinity of this fluid for the ſolid, though weaker than that of the other, will counteract the combination of the firſt fluid, and the baſis will remain divided betwixt them. Of this, we have an example in the diſengagement of the phoſphoric acid from lime, or earth of bones, by means of other acids which have a ſtronger affinity for lime than the phoſphoric acid. To produce a complete ſeparation, it is neceſſary to add, not only a quantity ſufficient to ſaturate the lime, but alſo a quantity ſufficient to counteract the oppoſing affinity of the phoſphoric acid for lime. Of this, other caſes were adduced under the firſt law. When the union of a fluid with a ſolid, is accompanied with the diſengagement of a gas, or elaſtic body, its eſcape ſeems to counteract the adheſion of the ſolid body, and to favour the combination of the fluid to the point of ſaturation. This is exemplified in the caſe ſo often alluded to, of the combination of the muriatic acid with a piece of marble, in which carbonic acid flies off in the ſtate of gas. The elaſticity of a gaſeous body reſiſts, or counteracts its affinity with a fluid or ſolid body. This is exemplified in the combination of carbonic acid with water, or with lime, where compreſſion of the gas powerfully accelerates the combination. In moſt combinations there is a point, called the point of ſaturation, where the forces of affinity and coheſion ſeem to balance each other, and beyond which, no farther combination takes place. The force of affinity ſeems progreſſively diminiſhed from the commencement of its action, until this point is attained. Thus, metals retain a ſmall quantity of oxygenous gas with much greater force than they retain the quantity which ſaturates them, or converts them into perfect oxydes. In moſt caſes, heat, by expanding the bodies, and diminiſhing their adheſion, enables a liquid to hold more of a ſolid body in ſolution. Thus, warm water diſſolves more alum, or of ſulphate of ſoda, &c.; than cold water.

Fifth Law.

When bodies combine together, they undergo a change of temperature.

(93.) All bodies contain a certain portion of caloric, which is not perceptible by our ſenſes. But when the conſtitution of the body is changed, its power of retaining this caloric is alſo changed, and heat is either given out or abſorbed, ſo that it becomes perceptible by our ſenſes, and can be meaſured by a thermometer.

(94.) It may be ſtated as a general rule, that when chemical combination is accompanied with a diminution of the volume, or bulk of one or both of the bodies combined, heat is evolved, or there is an increaſe of temperature during the combination; but if the volume of the combining bodies be enlarged, heat is abſorbed, or the temperature is diminiſhed. If the diminution of bulk by combination, be counteracted by the expanſion of ſome other ingredient, the temperature either remains ſtationary; or is raiſed or diminiſhed in the ratio of the exceſs of one of theſe cauſes over the other.

(95.) Examples in illuſtration of this, will be more properly introduced when we come to treat of the phenomena attending the combination of bodies in detail. At preſent, we ſhall only adduce an example or two in illuſtration of the ſeveral parts of the propoſition.

(96.) I. When water is poured upon quicklime, it undergoes a ſudden diminution of bulk, as it paſſes from a fluid to a ſolid ſtate, and becomes part of a ſtone. At the ſame time, the temperature is raiſed to a red heat. Here only the water ſeems to be diminiſhed in bulk, and to give out heat. But if one part of water be added to four parts of concentrated ſulphuric acid, the bulk of both is diminiſhed, and the temperature is very much increaſed; in other words, heat is evolved from both bodies.

(97.) II. When certain gaſes combine, their volume is much larger than the ſum of their volumes before combination. Such combinations are accompanied with an abſorption of heat, or a diminution of temperature.

(98.) III. When ſulphuric acid combines with quicklime, or with earth of bones, the temperature is raiſed nearly to a red heat. But if the ſame acid combines with carbonate of lime, no ſenſible variation of the temperature takes place. In this caſe, the expanſion of the carbonic acid, which aſſumes its elaſtic form, and flies off, abſorbs the heat evolved in the combination of the acid with lime. If the ſame acid combines with a hypercarbonate of lime, or of an alkali, the temperature is diminiſhed; becauſe more heat is abſorbed by the exceſſive quantity of the carbonic acid expanded, than is evolved by the combination of the ſulphuric acid with its baſis.

(99.) Another fact reſpecting the change of temperature in chemical combinations may deſerve notice under this head: That is, when a body paſſes rapidly from a ſolid to a fluid ſtate, or from a fluid to a gaſeous ſtate, it becomes colder, or its temperature is diminiſhed; and when it paſſes from a gaſeous to a fluid, or from a fluid to a ſolid ſtate, it gives out heat, or its temperature is increaſed.

(100.) I. Of the firſt, we have an example in the ſolution of muriate of ammonia, or ſal ammoniac, in water, which is accompanied with a conſiderable diminution of temperature, or generation of cold, as may be aſcertained by a thermometer plunged in the mixture. In this caſe only one of the bodies paſſes from a ſolid to a fluid ſtate. But if ice or ſnow be mixed with common ſalt, or ſtill more with powdered muriate of lime; as both the bodies paſs from the ſolid to the fluid ſtate, both abſorb caloric, and a very great diminution of temperature takes place: in other words, an intenſe cold is produced. The muriate of lime produces the greateſt effect, becauſe its combination with water is more rapid than that of common ſalt.

(101.) II. Of the increaſe of temperature produced by a body paſſing from a fluid to a ſolid ſtate, we ſtated the caſe of water combining with quicklime. Water remains fluid after it is ſeveral degrees below 32° the temperature at which it freezes. When in this ſtate, if it be ſhaken, it ſuddenly congeals, and at the ſame time its temperature riſes to 32°. Sulphate of ſoda, that has been melted in its water of cryſtallization, remains liquid at a low temperature. But if it be violently ſhaken, it ſuddenly conſolidates, and, at the ſame time its temperature riſes to its melting point.

(102.) Theſe examples are only adduced by way of illuſtration. The variations of temperature attending the extrication of gaſes have already been hinted at; and the other phenomena will be better underſtood when we come to treat of theſe bodies.

SIXTH LAW.

The compounds formed by chemical affinity poſſeſs new properties, which are different from those of their conſtituent parts.

(103.) The older chemiſts imagined that the properties of each of the ingredients were combined, or united in the compound. Hence they diſtinguiſhed the combinations of acids with alkalis by the name of *ſales medii*, middle ſalts; ſuppoſing them to unite the properties of their conſtituent parts. But this opinion ſeems to have been more the reſult of fanciful analogy, than of accurate obſervation. No ſimilarity can be traced between the properties of alkaline ſalts, and thoſe of their conſtituent ingredients. From chemical compoſition there reſults a *tertium quid*, or new body, poſſeſſing properties peculiar to itſelf, in which no property of the conſtituent parts can be traced. For example,

(104.) I. Oxygenous gas and the metals are bodies, each of which poſſeſs peculiar properties. When theſe bodies are combined, they produce oxydes, and in ſome caſes acids, which, except by their ſuperior weight, bear no reſemblance to the metals, and may rather be claſſed with earthy bodies. The colour of lead is a bluiſh white; but combined with oxygen, it is of a bright yellow, or red colour, according to the proportion of oxygen. Cobalt is of a grey colour; but combined with oxygen, it aſſumes a fine blue. Copper is of a dark red colour; but with this combination, it is of a lively green. With this combination, metals alſo loſe their malleability, their ductility, the texture of their parts, and their peculiar luſtre.

(105.) II. The ſmell of the muriatic acid and of ammonia, are both highly pungent. When theſe bodies are combined, the muriate of ammonia, or ſal ammoniac, which reſults, is perfectly inodorous. Each of the conſtituent ingredients is not only highly odorous, but ſo volatile, that unleſs they be united with water, or ſome other ſubſtance, they are always in the form of aerial, or gaſeous fluids. The ſal ammoniac, formed by their union, is ſo fixed that it requires more than a red heat to raiſe it into vapour. Thus, two highly odorous and gaſeous fluids, forming by their union a ſolid body, inodorous and fixed, exhibits a ſtriking example of the total change of properties effected by chemical affinity. Sulphur too, and potaſh, when ſeparate, have hardly any ſmell; when combined, and moiſtened with water, they emit a foetid and moſt offenſive ſmell.

(106.) III. Sulphur is nearly inſipid; and oxygen, which is one of the conſtituent parts of the atmoſphere, neceſſary for the reſpiration of animals, is not only harmleſs but ſalutary. When theſe two bodies are combined, they form ſulphuric acid, which is ſour and corroſive in a very high degree. Soda is alſo highly corroſive; but when combined with ſulphuric acid, the two corroſives form ſulphate of ſoda, or glauber's ſalt, which has a nauſeous and bitter taſte, and is uſed as a purgative ſalt; being entirely deſtitute of any corroſive quality.

SEVENTH LAW.

The force of chemical affinity, is eſtimated by the force which is neceſſary to ſeparate the ſubſtances which enter into combination.

(107.) In treating of coheſion, we ſtated that the force of this attraction was eſtimated by the oppoſing force, or weight, neceſſary to overcome it; and in treating of the adheſion of ſolids to fluids, we ſtated that it was eſtimated by the force neceſſary to ſeparate the ſurface of a body of given dimenſions, from the ſurfaces of fluids. Though this attraction bears a ſtrong reſemblance to that of chemical affinity; it was obſerved, that no concluſion could reſult from the experiments yet made on this ſubject, from which the comparative forces of chemical affinity between different bodies could be calculated.

(108.) In conſtructing tables of chemical affinity, the practice has hitherto been, to reckon that body to have the ſtronger affinity which precipitated another body from ſolution. But though this has been productive of much practical utility, and may exhibit the order in which different ſubſtances are diſpoſed to combine with a particular ſolvent, there are many caſes to which it is not applicable; and there is no term in the ſeries in which the force of affinity is aſcertained, and from which the other forces may be calculated. It was ſtated that the experiments of Berthollet, render this an uncertain criterion even of the order of affinity, as well as no exponent of its force.

(109.) Wenſel thought that the time which one body required to diſſolve another, might be taken as the meaſure of the force of affinity between theſe two bodies. But from what has been ſtated it muſt appear that the time requiſite for ſolution, muſt depend much on the degree of the coheſive force of the body to be diſſolved, and on the nature of the compound formed: ſo that no criterion of the force of affinity can be derived from this method. The difficulty of ſeparating bodies which have entered into combination; or the facility with which they are combined, have been propoſed as data, from which, to eſtimate the forces of affinities. But as neither the degrees of difficulty of ſeparating bodies, nor of the facilities of their combination have been aſcertained, no concluſion can be deduced from this method.

(110.) M. Lavoiſier and La Place, obſerving the union and abſtraction of caloric during the progreſs of chemical affinity, in a memoir publiſhed in 1783, propoſed this as a method of aſcertaining the force of chemical affinity. But it ſeems impoſſible to aſcertain chemical affinity by the temperature neceſſary to overcome the force of coheſion. Nor does it ſeem poſſible to meaſure the changes of temperature during chemical combination, as they are variable, and ſeem not to bear any relative proportion to the force of chemical affinity. A fixed term is therefore wanting from which to form a ſcale of compariſon.

(111.) Mr Kirwan, in the Philoſophical Tranſactions, Vol. LXXIII. propoſed to aſcertain the force of chemical affinity between the mineral acids, and the baſes with which they are known to combine by the quantity of each acid, of a known or ſtandard ſtrength, which is neceſſary to ſaturate a given weight of each of theſe baſes. He lays down two principles as the foundation of his method;

"I. That the quantity of real acid neceſſary to ſaturate a given weight of each baſe, is inverſely as the affinity of each baſe to ſuch acid.

"II. That the quantity of each baſe, requiſite to ſaturate a given quantity of each acid, is directly as the affinity of ſuch acid to each baſe.

(112.) Thus, 100 grains of each of the acids, require for their ſaturation, a greater quantity of fixed alkali than of calcareous earth; more of this earth than of volalkali; more of this alkali than of magneſia; and more of this than of the earth of alum, or pure clay. Upon this principle, he has conſtructed the following table of the quantities of ſeveral baſes neceſſary to ſaturate 100 grains, or parts of the ſeveral acids of ſtandard ſtrength, and the numbers under each baſe, are ſuppoſed to exhibit the comparative force of affinity of the ſeveral acids with the ſeveral baſes.

100 parts.	Potaſh.	Soda.	Ammonia.	Barytes.	Strontites.	Lime.	Magneſia.
Sulphuric.	121·48	78·32	26·05	200·	138·	70·	57·92
Nitric.	117·7	73·43	40·35	178·12	116·86	55·7	47·64
Muriatic.	177·6	136·2	58·48	314·46	216·21	118·3	89·8
Carbonic.	95·1	149·6		354·5	231· +	122·	50·

(113.) With regard to this method it may be obſerved, that it is very difficult to aſcertain the quantity of real acid in a given weight of the liquor; and that the reſults of different experiments by Mr Kirwan himſelf, do not correſpond. For inſtance, by one experiment, 215 grains of potaſh were employed to ſaturate 100 grains of ſulphuric acid; while, by the above table only 121·48 grains were neceſſary to ſaturate the ſame quantity. The cauſe of the difficulty of aſcertaining the quantity of real acid in a liquor, may be afterwards explained; but, at preſent, it may be obſerved that the above table does not correſpond with the order of affinities deduced from precipitation. Thus, barytes is underſtood to have a very ſtrong affinity with ſulphuric acid, and to abſtract this acid from moſt of its known combinations. Yet here its affinity with the ſulphuric acid is only 200; while with the muriatic acid, it is 314·46. From the experiments of Berthollet, above alluded to, it appears that the force of affinity varies in proportion to the difference between the maſſes of the bodies which operate upon each other; and whatever praiſe may be due to the ingenuity of this method it certainly will require many and laborious experiments to reduce it to a ſatisfactory reſult.

EIGHT LAW.

Bodies have different degrees of affinity for each other.

(114.) This has been frequently hinted at, in the explanations that were offered of the other laws of affinity; and a great part of the operations of chemiſtry depend upon the ſkilful application of this law: while by multiplying and extending its objects, the ſcience may be improved and extended.

(115.) We already divided affinities into *ſimple* and *compound;* or ſimple elective attractions, and compound elective attractions.

(116.) *Simple affinity* takes place, when two bodies combine together, as muriatic acid with lime. If into the compound thus formed, a ſolution of potaſh be dropped, the potaſh having a ſtronger affinity with the muriatic acid than the lime, the latter will be thrown out of combination, and will reſume its ſolid form. The lime, in this ſtate, is called a precipitate, and is ſaid to be precipitated by the potaſh: the reaſon is, that the lime ſoon falls to the bottom of the liquor, while the new compound of muriatic acid and potaſh remains in ſolution.

(117.) It is called a falſe precipitate when the new compound falls to the bottom. Thus, if ſulphuric acid be dropped into a ſolution of lime, the ſulphate of lime, thus formed, being ſcarcely ſoluble in water, goes to the bottom. A precipitate is ſaid to be pure when the decompoſed body can be reproduced by the union of its conſtituent parts. Thus, in the caſe alluded to, the muriate of lime may be reproduced by recombining muriatic acid with the lime which had been precipitated. A precipitate is ſaid to be impure when this cannot be effected; which is probably owing to the decompoſition not having been complete. In ſome caſes, the precipitate, or ſubſtance diſengaged from combination, remains in a liquid form, and floats on the ſurface of the liquor. Thus, if an acid be dropped into a ſolution of ſoap, which is a compound of alkali and oil, the acid will combine with the alkali, and throw the oil out of combination, which will float upon the ſurface. In other caſes, the diſengaged ſubſtance aſſumes the elaſtic form, and flies off in vapour. Thus, if a mineral acid be added to carbonate of lime or potaſh, the carbonic acid, formerly in union, flies off in vapour. Or if muriate of ammonia be decompoſed by means of lime, the muriatic acid will combine with the lime, from its ſtronger affinity, while the ammonia, or volalkali, aſſumes its elaſtic form, and flies off.

(118.) Of *double affinity,* which ſome alſo call *compound affinity,* we preſented an example in (84.) Some compound bodies can neither be decompoſed, nor combined with others, by means of ſingle affinity. But the ſame bodies may be decompoſed, and new combinations formed, if the decompoſing ſubſtances, or precipitants, be preſented in union with other bodies, which have a ſtronger affinity with ſome ingredient in the compound. As this principle is of great importance, not only to chemiſtry, but to the arts which are founded upon it, we ſhall endeavour to illuſtrate it by an example or two.

(119.) The acetous acid, or vinegar, can only be combined with alumina, or pure clay, by a ſlow and difficult proceſs. Nor will it decompoſe alum, becauſe the ſulphuric acid has a much ſtronger affinity with the baſis of alum, than the acetous acid. But if the acetous acid be combined with lead, or with lime, or with barytes, and in this ſtate, be preſented to a ſolution of alum, a twofold decompoſition takes place, and the acids exchange their baſes by double affinity. The ſulphuric acid combines with the baſis of the acetous ſalt, forming an inſoluble compound, which goes to the bottom; while the acetous acid combines with the baſis of the alum, forming acetate of alumina, which remains in ſolution. In this way, the calicoe printers prepare their acetate of alumina, which may be conſidered as the foundation of their art, as it fixes and adds brilliancy to their colours. They commonly uſe acetate, or ſugar of lead for producing the double affinity; but acetate of lime is much cheaper, and anſwers equally well.

(120.) Bergman introduced diagrams, and others have ſuperadded figures, to illuſtrate the doctrine of double affinities. But as theſe methods are apt to miſlead the reader into a belief that the ſum of theſe forces, and their relative proportions are known, which is far from being the caſe; we ſhall content ourſelves with illuſtrating by examples.

(121.) The ſulphuric acid does not combine readily with ſilver, and the compound is nearly inſoluble in water. The nitric acid combines readily with this metal, and the compound is ſoluble. But ſulphuric acid combines readily with potaſh, and forms a ſoluble compound. Suppoſe then that the two ſalts, ſulphate of potaſh, and nitrate of ſilver are mixed together in ſolution. The ſulphuric acid will quit its union with the potaſh, and combine with the ſilver, with which it will fall to the bottom; while the nitric acid will quit its union with the ſilver, and combine with the potaſh, with which it will remain in ſolution. Here then are two new compounds formed, by mixing theſe two ſalts together, viz: ſulphate of ſilver, and nitrate of potaſh; in conſequence of the double, or compound affinity, of the ſulphuric acid for the ſilver, and of the nitric acid for the potaſh.

(122.) In this caſe, there are, 1. The affinities of the ingredients in each compound, for each other, which muſt be overcome, before a decompoſition can be effected. 2. The alternate affinities of the ingredients of the one compound to thoſe of the other, which muſt be ſtronger than the firſt ſet of affinities, or no decompoſition of the original bodies, nor new compounds can take place. The affinities which combine the ingredients in the original compounds together, and which reſiſt decompoſition, Mr Kirwan diſtinguiſhes by the name of *quieſcent;* and the affinities which deſtroy theſe, and produce new compounds, he diſtinguiſhes by the name of *divellent.* He obſerves, "that a decompoſition will always take place when the ſum of the divellent affinities is greater than that of the quieſcent; and on the contrary, no decompoſition will happen when the ſum of the quieſcent affinities is ſuperior to, or equal to that of the divellent: all we have to do, therefore, is to compare the ſums of each of theſe powers. Thus, if the ſolutions of ſulphate of potaſh and nitrate of lime be mixed together, a double decompoſition will take place." In this caſe, we may obſerve, that the affinities oppoſed to each other are, 1. The quieſcent affinities of the ſulphuric acid to potaſh, and of the nitric acid to lime. 2. The divellent or alternate affinities, of ſulphuric acid for lime, and of nitric acid for potaſh. Any one of the 1ſt or quieſcent affinities, may be greater or leſs than any one of the 2d or divellent affinities. But if the ſum of the force, or amount of the divellent affinities, be greater than the amount of the quieſcent affinities, the firſt compounds, viz: ſulphate of potaſh and nitrate of lime will be deſtroyed, and new compounds will be formed of ſulphuric acid with lime, and of nitric acid with potaſh.

(123.) The ſame principle may be illuſtrated by mixing muriate of lime with carbonate of potaſh. The two quieſcent affinities here, are thoſe of the muriatic acid and lime, and of the carbonic acid and potaſh. The two divellent affinities are thoſe of the muriatic acid and potaſh, and of the carbonic acid and lime. The ſum of the latter being greater than that of the former, the acids will change their baſes, and the new compounds will be muriate of potaſh, and carbonate of lime.

(124.) Berthollet, ſo often referred to, has ſhewn that the relative forces of affinity are much influenced by the quantity of the bodies which act upon each other, and by the degree of ſaturation. Thus, when two oppoſing baſes act upon an acid, the acid divides its action in the proportion of the maſſes of theſe baſes. If there be two acids and no ſeparation takes place, both acids will act on each baſis in proportion to their maſſes. Hence, when the acids are previouſly combined with baſes, if theſe compounds be not mixed in ſuitable proportions, no change of baſes takes place; or at leaſt, the reſult of their mutual decompoſition is not perceptible. The ſalts of lime, and other bodies, when diſſolved in ſmall quantities of water, have the divellent affinities which produce decompoſition, ſtrengthened by the force of coheſion. The older chemiſts aſcribed the ſtrongeſt affinity to thoſe compounds which were inſoluble, or nearly ſo; and which, therefore went to the bottom. Of this claſs are compounds formed by carbonic acid with lime, magneſia, ſtrontites, and barytes. Sulphuric acid too, forms an inſoluble compound with lime; and many other baſes. When theſe are formed by double affinity, they aſcribed the ſtrongeſt affinity to the compounds which became inſoluble, and went to the bottom, not conſidering that the force of coheſion, which united the particles of theſe bodies into a ſolid, aided the force of the divellent affinity which effected the decompoſition. Theſe circumſtances increaſe the difficulty of appreciating the force of any affinity when viewed in the abſtract; or of aſcertaining its relative force, when compared with that of other affinities. Thus, muriate or any ſoluble ſalt of barytes, decompoſes the ſulphate of lime; becauſe the ſulphate of barytes, formed by the decompoſition, is abſolutely inſoluble: that is, its particles have a ſtronger tendency to cohere than thoſe of the ſulphate of lime; which poſſeſs a ſlight degree of ſolubility, or rather a ſmaller tendency to cohere, or become ſolid.

(125.) Different degrees of ſaturation produce great variations in the force of affinity of bodies for each other. This has already been hinted at in the caſes of the affinity between ſulphuric acid and water, and of metals and oxygen. In general, it may be ſtated, that the more the ſaturation advances, the more the affinity or force of combination decreaſes. This is ſubject to much irregularity in the ſame bodies; and, when compounds are brought to act upon each other, their divellent affinities will be much modified by variations in the quieſcent affinities ariſing from different degrees of ſaturation in the compounds. In illuſtration of this, it was obſerved, that lime does not abſtract all the carbonic acid from potaſh. But if the lime be not thoroughly burnt, that is, previouſly deprived of all its carbonic acid, it will abſtract a ſtill ſmaller proportion of the carbonic acid; becauſe it acts with greateſt force when it is perfectly pure, and every ſtep in its ſaturation diminiſhes its force, until the divellent comes to be balanced by the quieſcent affinity: a circumſtance which deſerves the notice of ſoap-boilers, &c. The ſame thing might be illuſtrated by numerous examples of double affinity.

(126.) Much variation in the force of affinity is alſo occaſioned by variations in the temperature. Thus, mercury at a low temperature, diſcovers very little affinity for oxygen. The affinity is much increaſed when the temperature is raiſed to 656°. At a ſomewhat higher temperature than this, the affinity is wholly deſtroyed, and a ſeparation of the bodies is effected.

(127.) The ſame variations in the reſult take place when compound bodies are brought to act upon each other. Thus, ſome ſalts at a low temperature, are diſpoſed to cryſtallize, or aſſume the ſolid form, while others remain in ſolution. When two ſuch ſalts are brought to act upon each other at a temperature which diſpoſes the one to conſolidate, it is evident, that, contrary to what was ſtated in (124.) the attraction of coheſion, in this caſe, tends to ſtrengthen the quieſcent affinities, and no mutual decompoſition can be effected by the divellent affinities. To give an example of this, nitrate of potaſh is more ſoluble at a low temperature than muriate of ſoda, which is nearly of the ſame ſolubility at a low as at a high temperature. If they be mixed, no exchange of baſes will take place, becauſe the ſolubility of the new compounds would be reverſed; that is, the nitrate of ſoda is ſomewhat more ſoluble when cold than nitrate of potaſh; and muriate of potaſh is more ſoluble when hot, than muriate of ſoda. Hence, in the new compounds to be expected from this mixture, there is no tendency towards conſolidation to aid and ſtrengthen the divellent affinities; while the tendency to coheſion acts wholly on the ſide of the quieſcent affinities, ſo as to reſiſt mutual decompoſition.

(128.) Berthollet has illuſtrated this ſubject by ſome very curious experiments; and has ſhewn, that in many caſes, the more ſoluble or deliqueſcent compounds, formed by the mutual decompoſition of two bodies acting upon each other, convey a degree of ſolubility to thoſe compounds which are uſually reckoned inſoluble. In this way the mutual decompoſition is rendered very partial, or altogether prevented. We conceive the cauſe to be what we have ſtated; that by preventing the conſolidation of one of the new compounds, the divellent affinities are no longer aided by the force of coheſion, and, of courſe, their amount does not ſurpaſs that of the oppoſing, or quieſcent affinities, to which the force of coheſion adds ſtrength.

Ninth Law.

Affinity is in the inverſe ratio of ſaturation.

(129.)

(129.) This has been frequently hinted at in the remarks which have been already offered, and it can be eaſily underſtood by a familiar example. If we take a quantity of water and of common ſalt, the water has a certain degree of coheſive force which unites its particles together, and the particles of the ſalt alſo cohere. But theſe bodies have a ſtronger affinity for each other, than the ſum of the coheſion of their ſeveral particles. If then, a ſmall quantity of the ſalt be put into the water, it will be attracted by the whole affinity of the water for ſalt, which attraction will only be reſiſted by the ſum of the coheſion between the particles of the water and ſalt reſpectively. If a ſecond portion of the ſalt be added to the water, it is now attracted only by the affinity of that portion of the water which has not combined with ſalt; while the reſiſting force of coheſion remains the ſame. Thus, a third and a fourth portion of ſalt may be added, until every particle of water has combined with a particle of ſalt; and the force of affinity comes to be balanced by the force of adheſion. When this happens, the water will diſſolve no more ſalt; and it is then ſaid to be ſaturated.

(130.) Here it is evident, that the affinity, or force of combination, is perpetually diminiſhing; while the oppoſing force remains the ſame. They will hence come to balance each other.

(131.) Some bodies combine with each other in all known proportions; as the ſulphuric and muriatic acid, &c. with water. Others combine only in a few proportions, as lead with a ſmall proportion of oxygen is black; with a greater it is yellow; and with the greateſt known proportion it is red. Other bodies combine only in certain determinate proportions, which are fixed and invariable, as the acids with the alkalis. When this proportion has been attained, the compounds diſplay neither the properties of acids nor of alkalis; the ingredients are ſaid to have *neutralized* each other; and the compounds are called *neutral ſalts*. When bodies combine in more than one proportion, the extremes are called their *minimum* and *maximum* ſaturation. In all caſes, as in the example of water and ſalt, the attractive power, or affinity, is in the inverſe ratio of ſaturation.

TENTH LAW.

Between two compound bodies which are not acted on by compound affinity, decompoſition may take place, if the affinity of two of the principles for a third be greater than that which unites this third to one of the two firſt; although, at the moment of action, the union between the two firſt does not exiſt.

(132.) This is called *diſpoſing*, or *prediſpoſing* affinity; becauſe no change takes place without the action of a third body on ſome of the compounds, which third body is not itſelf capable of effecting their decompoſition, or of producing new compounds. An example will render this more intelligible.

(133.) Water is a compound of two ſubſtances which have obtained the names of oxygen and hydrogen. Sulphur has no direct action upon water, apparently becauſe its divellent affinity to the conſtituent principles of water, diminiſhed by its coheſion, is weaker than the affinity of oxygen and hydrogen. But ſulphur combines with an alkali, which has an affinity to water; but has no divellent affinity to either of its principles. When combined with an alkali, ſulphur decompoſes water, by combining with its oxygen, with which it forms ſulphuric acid. It would ſeem, that the alkali here, which is paſſive in the decompoſition of the water, only ſerves to bring the particles of the water and ſulphur into cloſe union; and by deſtroying the coheſive power of the ſulphur, to allow it to exert its divellent affinity for the oxygen of the water, without being fettered by this counteracting force. Hence the affinity of the alkali and ſulphur is called a *prediſpoſing* affinity; becauſe it qualifies the ſulphur to effect a decompoſition of which it would otherwiſe be incapable.

(134.) Some have defined chemiſtry to be a hiſtory of affinities; and it certainly conſiſts in aſcertaining the phenomena of the compoſitions and decompoſitions of bodies. We have already expreſſed our diſlike to the word *affinity*, as founded on a falſe theory, and calculated to miſlead. The word *attraction* appears preferable; and when it is neceſſary to diſtinguiſh this mode of its operation from gravitation, adheſion, or coheſion, the word *chemical* might be prefixed. But the word *affinity* having got into vogue, we are under a neceſſity of adhering to it, however awkward, in many caſes, its application may be.

(135.) Having thus preſented a general outline of the principles of chemiſtry, illuſtrated by ſuch examples as ſeemed neceſſary to render them intelligible; we proceed now to the application of theſe principles in explaining the phenomena of bodies. In this we ſhall endeavour, as much as poſſible, to follow the rule already hinted at, of conſidering bodies in the order of their ſimplicity, or of their importance as chemical reagents.

SECT. V. *Of* LIGHT.

(136.) Every one who is endowed with the ſenſe of ſight, knows what light is, and that the ſun is the great fountain of light to our ſolar ſyſtem. Light is not an object of any of our ſenſes except one; and were it not for the very curious mechaniſm of the eye, the exiſtence of light, and of colour, would ever have remained a ſecret to us. In ordinary language, we are apt to confound the ſenſation, or perception of light, with the ſubtile fluid which occaſions this ſenſation, or the effect with its cauſe. The ſenſation, to which we give the name of light, is produced by the impulſe of very minute particles of matter upon the retina, or expanſion of the optic nerve, by far the moſt irritable of all organs of perception, which paſſing through a lens compounded of the three humours of the eye, are drawn to points on the retina, correſponding to the points of the body from which the light was projected. Thus, a ſmall image of the body from which light iſſues, is marked by the converging rays on the retina, or optic nerve, ſimilar to what takes place in the *camera obſcura*. But that light is merely a ſenſation produced by impulſe; and that our perception of light has no reſemblance to its cauſe, appears from this, that by gently compreſſing the optic nerve, at the bottom of the eye, we can be made to ſee light of various colours. The difference is, that this ſenſation, not being produced by particles projected from a body, no image is formed, and no object is perceived. But this fact proves that any ſort of impreſſions which affect the optic nerve in the ſame way as the impulſe of theſe minute particles, excite ſenſations, accompanied with perceptions, to which we give the name of light and colour.

(137.) Here a preliminary queſtion occurs, which may deſerve a little diſcuſſion: Whether light be a body *sui generis*, differing in its characteriſtic qualities, from all other kinds of matter; or if any kind of matter whatever, which has acquired a ſufficient degree of minuteneſs and velocity, may not exhibit all the phenomena of light.

(138.) It would be wandering from the ſubject, were we to enter into an examination of all the arguments that may be urged in ſupport of each alternative of this queſtion. But we have already declared our opinion, that what are called elementary bodies are much fewer in number than is commonly ſuppoſed; and what follows, creates at leaſt a ſtrong probability in favour of the opinion that any kind of matter becomes light, when reduced to very minute particles, and put into very rapid motion.

(139.) It is a principle invincibly eſtabliſhed, by Sir Iſaac Newton, that the *momentum*, or *force*, of bodies in motion, is in a ratio compounded of their velocities and quantities of matter.

(140.) We can form ſome idea of the velocity of light from this circumſtance, that Roemer, a Daniſh philoſopher, from obſervations on the eclipſes of Jupiter's ſatellites; and Dr Bradley, from obſerving the aberration of light from the fixed ſtars; have demonſtrated, that light traverſes a ſemidiameter of the earth's orbit in about eight minutes, or moves at the rate of about 200,000 miles in a ſecond. A cannon ball, at point blank diſtance, moves at the rate of about 1300 feet in a ſecond; and could hardly travel from our earth to the ſun in thirty-two years.

(141.) From the amazing velocity of light, we may form ſome indiſtinct idea of the incalculable minuteneſs of its particles. Were theſe particles endowed with any ſenſible magnitude, their velocity would convey to each particle, a force more formidable than that of the heavieſt cannon-ball. Yet with all this extreme velocity, the particles of light are ſo very minute, that they make not the ſmalleſt impreſſion on any but one of our organs of perception; and this too, only in conſequence of the wonderful conſtruction of the teleſcopic lens, which concentrates the impulſe of the rays upon points on the optic nerve, correſponding to points of the body from which they were projected, as already obſerved.

(142.) Light always moves in ſtraight lines, diverging as they recede from the luminous body. Thus, like gravitation and all powers propagated in right lines from a centre, its intenſity is inverſely as the ſquares of the diſtances from the luminous body. When light paſſes from a rarer to a denſer medium, in a perpendicular direction, it is accelerated, but does not change its rectilinear courſe. But if it paſſes in an oblique direction, it is bent from its former direction, and is ſaid to be *refracted*. When it paſſes into a denſer medium, it is refracted *towards* the perpendicular; but when into a rarer medium, it is refracted *from* the perpendicular. In general the angle of refraction is proportional to the denſity of the medium; but combuſtible media refract more powerfully than thoſe which are not combuſtible. In the ſame medium the ſines of the angles of incidence and refraction have always the ſame ratio to each other.

(143.) If a ray of light be introduced into a dark room, through the ſhutter, and made to paſs between the edges of two knives, it will be expanded, or enlarged in breadth upon a ſheet of white paper; the rays neareſt the knives being bent towards them on each ſide, and are ſaid to be *inflected*. Rays which paſs at a greater diſtance from a ſimilar object, are bent from it, and are ſaid to be *deflected*.

(144.) Rays are more or leſs reflected from every ſurface of bodies. From poliſhed ſurfaces, eſpecially thoſe of metals, they are reflected in great quantity. When a ray falls obliquely on a tranſparent medium, ſuch as glaſs or water, it paſſes through, and is reflected from the oppoſite ſurface. When a perpendicular is drawn to the reflecting ſurface, at the point of incidence, the angle of incidence is always equal to the angle of reflection. It has been demonſtrated that reflected rays do not come in contact with the reflecting ſurface; but when they fall obliquely, they form a ſmall curve on one ſide, with a retarded motion, on the other with an accelerated motion.

(145.) Newton has ſhewn that theſe phenomena are to be aſcribed to the laws of attraction and repulſion, which operate on light in common with all other matter.

(146.) Some bodies, ſuch as glaſs, &c. admit light to paſs through them, and are *tranſparent*. Others, as iron, &c. do not tranſmit light, and are *opaque*. Newton has ſhewn that tranſparency is owing to the particles of bodies being uniformly arranged, and of equal denſity. When light enters ſuch a body, being equally attracted in all directions, it is in the ſame ſituation as if it were not attracted at all, and therefore paſſes through. It cannot be doubted but that all bodies contain ſufficient vacuities to admit the free paſſage of light; but when their particles are not uniformly arranged, or when they are of unequal denſity, the light is expoſed to unequal attraction, which cauſes a conſtant change of direction, and is repelled by ſuch a number of ſurfaces of varying denſities, that it cannot find its way through them. Thus, when glaſs has its uniform texture deſtroyed, and its ſurfaces multiplied by pounding it, it is no longer tranſparent. The ſame obſervation is applicable to water, when beaten into froth by mixing with air; though each of theſe ſubſtances be highly tranſparent when ſeparate.

(147.) The ſolar light appears white, but when a circular ray is admitted through a hole of the ſhutters, into a darkened room, and is made to paſs through a triangular priſm, it is elongated into a figure called a *ſpectrum*, whoſe ends are bounded by ſemicircles. At the ſame time, the rays no longer exhibit a white appearance, but are divided into ſeven colours, called the priſmatic rays. This is owing to the different refrangibility of theſe rays; or the different degrees of attractive power in the priſm, in drawing the rays from their rectilinear courſe. The colours, in the order of their refrangibility, are as follow; RED, ORANGE, YELLOW, GREEN, BLUE, INDIGO, VIOLET: the red being leaſt bent from its rectilinear courſe, the violet moſt. Newton has aſcertained, that if the whole ſpectrum be divided into 360 parts,

The red will occupy	45 of theſe parts,
Orange	27
Yellow	48
Green	60
Blue	60
Indigo	40
Violet	80
	360

Theſe are called the primary colours, and their proportions, even in ſolar light, have been ſince found to vary from particular circumſtances, and according to the refracting medium. Other kinds of light, except when of an intenſe white colour, contain more various proportions of the ſeven coloured rays. Each of theſe coloured rays is permanent, and cannot be altered by ſucceſſive refractions or reflections. The inflection and deflection of theſe ſeveral coloured rays is always in the ſame ratio with their refraction: the direction of the red being leaſt changed by each of theſe methods, the violet moſt. Theſe conſtitute the mechanical properties of light, for which, ſee OPTICS.

(148.) Some bodies abſorb one or more of theſe coloured rays, and reflect the remainder; and this is the cauſe of all that variety of colour with which objects are adorned. A black body abſorbs all the rays, and a white body repels them all; though we are acquainted with no body that is either perfectly abſorbent, or repellent. Accordingly, bodies may be made to exhibit any colour, by throwing upon them the ſeveral priſmatic rays, or various mixtures and proportions of theſe rays. The abſorption and repulſion of particular rays, is produced by the peculiar texture of the ſurfaces of bodies; and the arts of dyeing and painting conſiſt in altering and modifying the ſurfaces of bodies, ſo that they may abſorb one ſet of rays, and repel others.

(149.) It thus appears that light is attracted by bodies in a way very analogous to chemical affinity; and that it is repelled from the ſurfaces of other bodies, every way analogous to other repulſions, before it gets within the ſphere of chemical attraction. It has alſo been ſeen that inflammable ſubſtances attract light more powerfully than thoſe which are not inflammable; and from this circumſtance, the ſagacious Newton conjectured that water contained, and that diamond was, an inflammable ſubſtance: a conjecture that has ſince been fully verified by experiment.

(150.) How are we to account for the phenomena already detailed, and eſpecially for thoſe exhibited by the triangular priſm? Are we to ſuppoſe that light is not only a genus of matter differing from all other genera; but that a white ray is compounded of ſeven diſtinct genera of matter?

(151.) When a ray paſſes through the priſm, it is acted upon by two forces, 1. The propelling force, which carries it forward in a ſtraight line; the ratio of which was explained (142.) 2. The attracting force towards the thickeſt part of the priſm. The new courſe of the ray will be in the diagonal of a parallelogram compounded of both theſe forces. We are therefore led to ſuppoſe that light is compoſed of particles of different magnitudes, or rather quantities of matter. As they all move with the ſame rapidity, their ſeveral momenta, or forces, will be proportional to their quantities of matter; and the particles which have the greateſt momentum will be leaſt attracted, or deviate leaſt from their original direction. Hence we may infer, that their momentum is greateſt, or that their particles are of the largeſt ſize or denſity. The orange is next in the order of refrangibility; and it would ſeem its particles are ſmaller, or leſs denſe than thoſe of red: and ſo on, the violet being moſt refrangible, or made up of the ſmalleſt particles, whoſe momentum oppoſes the leaſt reſiſtance to the attracting power of the priſm.

(152.) In this way, different degrees of force, produced by different quantities of matter in the particles of which light is compoſed, may account for the different refrangibility of the primary rays. But how are we to account for theſe particles exciting the idea of different colours when they ſtrike upon the retina, or optic nerve? We apprehend this may alſo be aſcribed to their different degrees of momentum, or force, without having recourſe to the complex hypotheſis of ſeven diſtinct kinds of matter, compoſing the primary rays or colours. We have already obſerved (136) that any mechanical impulſe on the optic nerve, excites a perception of light; and a ſtrong impulſe excites a perception of red colour. This correſponds with the phenomena of the priſm; and the particles which are leaſt refrangible, becauſe they have the greateſt momentum, from the ſame cauſe, ſtrike the optic nerve with greateſt force, and excite the idea of redneſs; which is merely a conception of the mind excited by the irritation of the nerve, and has no ſimilarity to the cauſe which produced it. The ſame may be obſerved of all the other primary rays, that they excite perceptions of colour correſponding to the different degrees of force with which they ſtrike and irritate the optic nerve. It may hence appear that the blind man, who imagined a red colour reſembled the ſhrill ſound of a trumpet was not guided by a very abſurd analogy. It is certain, that a vivid red is offenſive to the eye, from the violent impulſe of the particles which excite this ſenſation. It alſo ſtrains the eye, by exciting a contraction of the pupil, and an adjuſtment of the different humours to exclude its exceſs. The violet again, from its feeble momentum, ſtrains the eye, by exciting an expanſion of the pupil, and a contrary arrangement of the humours, in order to its diſtinct perception. Thus, neither extreme of the ſpectrum is favourable to diſtinct viſion; and objects are moſt diſtinctly ſeen when they reflect rays of a medium refrangibility. Green, which is in the centre of the ſpectrum, gently ſtimulates the optic nerve without proving painful to it, and without requiring the mechaniſm of the eye to be put on the ſtretch, in order to the diſtinct perception of objects which reflect it. Green is therefore, with great propriety, the general colour of nature. Thus, as in the caſe of refraction by the priſm, we humbly apprehend that the various ſenſations to which we give the name of colours, may be accounted for from particles of different ſize, or different force, ſtriking upon the optic nerve. Thus colour, like ſound, will appear to be merely the effect of different degrees of mechanical impulſe.

(153.) That light is abſorbed by various bodies, and ſoon after given out unchanged, was proved by father Beccaria, and ſeveral others. Many bodies, after being expoſed to the ſun's rays, and ſuddenly removed to a dark room, are ſeen to emit light for a ſhort time. The experiment may be repeated as often as we pleaſe to expoſe the bodies to light, and then ſuddenly remove them to a dark place: and the experiment is the more ſucceſsful when the ſpectator remains in the dark, ſo that his pupil may be expanded, and his eyes adjuſted for receiving impreſſions from ſmall quantities of light. Mr Canton made ſeveral curious experiments on this ſubject, and diſcovered a compoſition which poſſeſſes this property in a remarkable degree. It conſiſts of oyſter ſhells calcined in a good coal-fire for half an hour, pounded, and the pureſt parts of them ſifted. Three parts of this powder are mixed with one part of flowers of ſulphur, rammed in a crucible, and kept red hot for an hour. The brighteſt parts are then ſcraped off, and kept for uſe in a dry phial well ſtopped. In making this preparation, Dr Higgins ſtratifies the oyſter ſhells and ſulphur in a crucible, without pounding them; and after expoſing them to the proper heat, they are kept in phials furniſhed with glaſs ſtoppers. When this compoſition is expoſed to light for a few ſeconds, it becomes ſufficiently luminous in the dark to enable a perſon to diſtinguiſh the hour on a watch. After ſome time it ceaſes to ſhine; but recovers this property as often as it is again expoſed to light. Some degree of doubt remains whether we are to aſcribe theſe effects to a ſlow combuſtion excited by light, or to the combination of bodies with light, which afterwards quits them without change. The latter is the general opinion; and we confeſs it would be demonſtrated were this preparation made to combine with red, blue, or other coloured light, and afterwards to emit light of the ſame colour.

(154.) To prove that combuſtion has no ſhare in producing the phenomena now detailed, portions of Canton's pyrophorus were put into two glaſs globes, and hermetically ſealed. Being expoſed to light, and carried into a dark room; one of them being plunged into a baſon of boiling water, became much more luminous than the other, but in ten minutes ceaſed to give out light: the other remained viſible more than two hours. After having been kept in the dark two days, they were both plunged into hot water; when the one which had formerly been in the water did not ſhine, but the other became luminous, and continued to give out light a conſiderable time. When expoſed to the heat of a piece of iron, juſt become viſible in the dark, both of them gave out their remaining light; and did not ſhine any more until they were again expoſed to light as at firſt. Even a lighted candle, and electricity, communicated ſome light to them. Theſe facts, it is alledged, prove that light may be imbibed, and afterwards emitted from bodies, without combuſtion, which requires the preſence of air or oxygen. They alſo prove that increaſe of temperature accelerates the ſeparation of light, by counteracting its affinity with the bodies with which it had combined; as happens in many other caſes of affinity. But we do not know all the caſes in which combuſtion may take place; and, as already hinted, the proof would be much more deciſive were the pyrophorus to give out light of the ſame identical colour which had been imbibed by it. Mr Wilſon has proved that, in many caſes at leaſt, this does not happen, and that blue light thrown on ſome pyrophori, cauſes an extrication of red light. M. de Greſſer has ſhewn that the ſame thing happens with the diamond, which is a natural pyrophorus: and it ſeems yet undecided whether the light which was imbibed is again emitted from bodies; or if the imbibed light only acts as a ſtimulus, to excite the bodies to throw out light from their own ſubſtance.

(155.) But it is alledged that light is not only imbibed and afterwards emitted from bodies; but that it enters into chemical union with them, and forms a conſtituent ingredient in their compoſition. Moiſt rotten wood, leaves of trees, peat bog, and a great variety of vegetable ſubſtances are quoted as examples of this, which ſhine in dark nights, eſpecially when ſtirred and agitated, and thus expoſed to the air. The glow-worm, and many tropical flies, ſhine in dark nights, and herrings exhibit a bright luminous appearance, even at a great depth, when they move through the ſea. The ſea alſo becomes luminous when agitated during dark nights. Putrid meat and fiſh of various ſpecies, alſo exhibit a bright luminous appearance in the dark. Among fiſh, this property is moſt remarkable in the whiting, the herring, and the makerel. Mr Canton and Dr Hulme made many experiments with a view to aſcertain the cauſe of this luminous appearance in bodies. If four drams of either of the laſt mentioned fiſh be put into a phial containing two ounces of ſea-water, or of pure water holding in ſolution $\frac{1}{2}$ dram of common ſalt or two drams of ſulphate of magneſia. Within three days, a luminous ring appears on the ſurface of this liquid, when the phial is put in a dark place; and when agitated the whole becomes luminous, and continues ſo for ſome time. When the liquid is frozen the light diſappears; but returns again when it is thawed: a moderate heat increaſes its intenſity, but a boiling heat extinguiſhes it entirely. As in theſe caſes of the emiſſion of light from bodies, no ſenſible increaſe of temperature can be diſcovered by the thermometer; and as in the caſe of the phial, light is emitted where the uſual requiſites of combuſtion do not operate, theſe have been held as deciſive proofs of the chemical union of light with bodies, which eſcapes while the bodies are reſolving into their original elements. Not to enter into any elaborate diſcuſſion upon this ſubject, we may obſerve that the caſes alluded to have a very ſtriking reſemblance to combuſtion, though ſlow in its progreſs. The ſlowneſs may be the reaſon why heat, though evolved, is not perceived: nor does it ſeem at all improbable that combuſtion, in certain caſes, may evolve light without heat.

(156.) The growth of plants is quoted as another example of light entering into chemical union with bodies. It ſeems extremely probable that carbon, and many other inflammable ſubſtances, owe their original formation to the action of light; but whether light produces its effect by chemical affinity, or in what way it operates, ſeems yet to be uncertain.

(157.) Plants may be made to grow in a dark place; but in this ſituation their ſpecies cannot be diſtinguiſhed. They have no peculiar ſmell or taſte, and they are deſtitute of carbon, and of every inflammable ingredient. If a potatoe, a vine, a hop-plant, &c. be made to grow in a houſe to which light is only admitted through a ſmall hole, they will grow towards the light. If this hole be ſhut and another opened in ſome other place, they will change their courſe towards this new aperture; and ſo on, as often as the place at which the light is admitted is changed. When they have ſucceeded in puſhing through this hole, into the external air, they form green leaves, and aſſume all the properties which diſtinguiſh their ſpecies. Trees, which have light on all ſides of them, grow perpendicular; though they form the moſt rapid accumulations of wood towards the ſouth, or on the ſide where the greateſt quantity of light falls. Plants which grow under the ſhade of trees, or walls, always bend towards the light; becauſe on this ſide they receive the greateſt accumulations of matter. Plants ſhut their flowers, and many of them their leaves in the dark, and expand them again to the ſun's rays. Some even exhibit this phenomenon before an approaching ſtorm.

(158.) It has been found that theſe phenomena are owing to the decompoſition of water, of carbonic acid, and other carbonaceous gaſes contained in the ſap of plants. The hydrogen and carbon are depoſited, and become a part of the plant, while the oxygen, or reſpirable air is thrown out, and mingles with the atmoſphere. None of theſe decompoſitions ever take place except when the plant is expoſed to light; and the light of lamps, if of ſufficient intenſity, is found to anſwer equally well with that of the ſun. Now the queſtion is whether the light acts by chemical affinity in this proceſs, combining with the inflammable baſis which remains in the plant, and precipitating the oxygen, which is thrown out: or whether it merely acts as a ſtimulus to excite the action of the vital organs of the plant, to effect this decompoſition without any chemical combination of the light? The animal organs effect many decompoſitions, and new compounds, without the aſſiſtance of light; and their energy is much increaſed by the application of certain ſtimulants, which do not act upon the compounds but upon the organ which produces them. Of this latter opinion is the ingenious profeſſor Leſlie, who, in his enquiry into heat, p. 163, thinks that in this, and the caſes about to be ſtated, "The peculiar energy of light may with reaſon be aſcribed to its force of impulſion. Moving with inconceivable rapidity, the progreſs of its particles cannot be ſtopped without occaſioning in the obſtacle a vehement, though diffuſe, reaction." Light has not only the power of ſeparating oxygen from plants, but alſo from ſome of the metallic oxides. Thus the oxide of gold is reduced by expoſure to the ſun's rays. The oxide of ſilver becomes black, and is reduced. Scheele firſt obſerved that the violet ray ſooner reduces the oxide of ſilver than any other ray. Red oxide of lead, and of mercury, become much lighter after expoſure to the ſun. Berthollet obſerved, that during theſe reductions, oxygen gas is extricated. Sennebier alſo aſcertained that the violet ray has a more powerful effect than any of the others, in producing the green colour of plants.

(159.) But Meſſrs. Wollaſton, Ritter, and Bockman, have found that muriate of ſilver blackens moſt rapidly when placed entirely out of the ſpectrum, and beyond the violet ray. They have hence been led to conclude that neither the *colorific* rays, of which we have been treating, nor the *calorific* rays to be afterwards deſcribed, have any influence in producing the phenomena in queſtion; but that the ſun ſhoots forth another ſet of rays which are more refrangible than the others, as they act beyond the violet. Theſe are not perceptible by any of our ſenſes; nor do they affect the thermometer: but from their power of decompoſing oxides, they have affixed to them the name of *de-oxidizing* rays. To a mixture of theſe with the other rays, they impute the effects we have juſt been deſcribing; though many experiments ſeem yet neceſſary to aſcertain this point.

(160.) Having detailed what is known concerning the general properties of light, we ſhall conclude this article with a ſhort enumeration of its *ſources.* Theſe are, 1. The Sun and Stars. 2. Combuſtion. 3. Heat. 4. Percuſſion, or friction.

(161.) I. Why the ſun, and ſtars, which are ſuns to other worlds, continually emit light, is a queſtion which ſeems to be above the reach of the human faculties to explain. But of the two opinions that have been entertained on this ſubject, that which aſcribes the tranſmiſſion of light to a projectile force exerted in the ſun, appears much more probable, and conſiſtent with the planetary motions, than the opinion that light is only an impulſe conveyed through a medium of ſubtile matter, like the propagation of ſound. But how this projectile force is generated, and how it operates, are likely to remain for ever unknown to us. As the ſun contains much more matter than all the planets, and their ſatellites, which revolve around him, it is very probable that whatever light and heat he may dart around him, he is not haraſſed by a diſagreeable exceſs of either, and that he may be a commodious habitation for various orders of animated beings.

(162.) As the ſun is perpetually emitting light, it has been inferred that his ſubſtance muſt be perpetually diminiſhing; and that, in the language of Oſſian, he muſt *grow dim with years.*

(163.) Profeſſor Leſlie, [Inquiry p. 179.] by a very ingenious calculation endeavours to prove, that all the light that falls upon the interior cavity of the earth's orbit, ſuppoſing it formed into a ſolid concave ſphere, with the ſun in its centre, would, in the courſe of a year, only accumulate to the 34,223,000th part of a foot in thickneſs, of matter of the denſity of water. Suppoſing this matter to be all conglomerated together, and ſtill of the denſity of water, it would form a globe of 49·878, or nearly fifty miles in diameter. He infers that the light which the earth annually receives from the ſun, is equal in weight to a ſphere of water 139 feet in diameter. Suppoſing the denſity of the ſolar ſubſtance to be 3½ times leſs than that of water, the ſun, by the continual diſcharge of light, will ſuffer a waſte from his ſurface of the depth of one foot only in the ſpace of 700 years: "a quantity ſurely too inconſiderable, compared with his vaſt maſs, to occaſion any ſenſible relaxation in the planetary motions during the countleſs revolutions of ages."

(164.) But there are ſome points which the ingenious profeſſor has not included in his calculation; and it is highly probable that the ſun does not ſuffer even this degree of waſte of ſubſtance by the continual diſcharge of light. All the light which ſtrikes and is abſorbed by the planets, is but an infiniteſimal proportion of what is projected into ſpace, and never encounters any object. We may ſuppoſe this to be acted upon by the gravitating power, which will at laſt overcome the projectile force, and carry it back to the ſun, to be again projected when it comes within the reach of the ſolar energy. The motion of this returning light may be ſo ſlow, as not to make a perceptible impreſſion on our optic nerves; but bats, owls, toads and other animals which ſee beſt in the dark, ſeem to do their buſineſs by the aid of this returning light, part of which ſtrikes the earth. Even of the light which ſtrikes the planets and their ſatellites, a great proportion is reflected, and a ſmall proportion is abſorbed. Every one may be ſenſible of this who has obſerved what is called the *old moon in the new moon's boſom.* This is a part of the moon illuminated by light reflected from the earth; and if we conſider how much the divergency of the rays muſt have been increaſed, by being reflected from the earth to the moon and back again, and that they ſtill poſſeſs energy ſufficient to excite diſtinct viſion, we will be led to infer that the quantity conſtantly reflected from the earth and planets, is very great. It is probable that all this reflected light finds its way back to the ſun: and thus, the only diminution of the ſun's ſubſtance will ariſe from the minute portion of light abſorbed by the planetary ſyſtem, and the ſtill minuter portion which reaches and is abſorbed by other ſyſtems in the remote regions of ſpace. A diminution this ſo extremely ſmall, that it defies imagination to conceive, or calculation to aſſign, its amount.

(165.) II. Combuſtion is the act of combining oxygen with the combuſtible body; and during this proceſs light is generally omitted. A queſtion has been much agitated whether the light comes from the combuſtible body, or from the oxygen. Thoſe who hold light to be the phlogiſton of Stahl, aſſert that light forms a chemical union with combuſtible bodies, and is expelled, or precipitated, by oxygen, which has a ſtronger affinity with theſe bodies than light. Others think that light forms a conſtituent ingredient in the compoſition of oxygen, and that it is precipitated from this combination, and let looſe, during the combination of the former with combuſtible bodies. But if what was ſtated (151, 152.) concerning the nature of light have any foundation, it is probable that the light may neither be detached wholly from the oxygen nor from the combuſtible body; but may be minute particles of matter projected from both, by the violent colliſion which takes place during their union. But as we ſhall have occaſion to treat of combuſtion more fully afterwards, it is only neceſſary to mention this proceſs here as one of the ſources of light.

(166.) III. When bodies are heated to a certain temperature, they emit light; and this is commonly called a red heat. Sir Iſaac Newton, by a very ingenious ſet of experiments, aſcertained that iron is juſt viſible in the dark, when heated to 635°; that it ſhines ſtrongly when raiſed to 752°; that it is luminous juſt after ſunſet at 884°; that when it ſhines in broad day-light, its temperature is above 1000°; and that what is commonly called a *red heat*, commences about the temperature of 800°.

(167.) A heated body continues to emit light ſometime after it is put into a dark place; and hence conſtant acceſſions of heat and light are not neceſſary to produce this effect. But if it be cooled below a certain temperature, by a current of air, or otherwiſe, it no longer emits light. The luminous temperature is found to be the ſame in all bodies, when in ſimilar circumſtances; and the action of air is not neceſſary to their emitting light, becauſe an iron wire becomes luminous when immerſed in melted lead. Mr T. Wedgewood diſcovered one remarkable exception to this general rule; that gaſes, though heated to the luminous temperature of other bodies, do not become luminous.

(168.) IV. By percuſſion and friction, light is generated. It is well known that when flint and ſteel are ſtruck upon each other, a ſpark is generated, which ſets fire to tinder and gun-powder. By collecting theſe ſparks upon a ſheet of white paper, Dr Hooke aſcertained that a ſmall particle of the iron is detached, which takes fire in paſſing through the air. This therefore forms a caſe of combuſtion. But if two pieces of quartz, and various other ſtones, be ſtruck, or violently rubbed againſt each other, light is emitted; and this ſucceeds under water, as well as in the air. When theſe ſparks are received upon white paper, ſmall black particles are found, reſembling eggs of flies which muriatic acid changes to a green colour, as it does that of lavas. La Metherie aſcertained that no oxygen entered into their compoſition; and Monge aſcertained that they conſiſted of ſmall particles of quartz, or pure cryſtal, which had been fuſed, inveſted with a black powder, which he ſuppoſed owing to minute bodies which they had fired in paſſing through the air. This then ſeems to form an illuſtration of the opinion ſtated (138.) that any kind of matter, by mere mechanical comminution and velocity may be made to exhibit the phenomena of light. When quartz and other hard ſtones are ſtruck, or rubbed together, even though with leſs violence than is neceſſary to produce a ſenſible emiſſion of light, a ſmell reſembling that of burning gun-powder is perceived. This is probably owing to particles detached which are ſufficiently minute to affect the olfactory nerves; but have neither minuteneſs nor velocity, ſufficient to exhibit the phenomena of light. A ſimilar ſmell ariſes from the impalpable powder of quartz uſed in the potteries.

Sect. VI. *Of* Heat, *or* Caloric.

(169.) In common language, the word heat is applied indiſcriminately to denote a feeling, or perception of the mind, and the material cauſe of that feeling. Hence the word **Caloric** has been invented to denote the material cauſe of this feeling. Thus when we plunge our hand into warm water, we ſay we *feel heat;* and the cauſe of this feeling is *caloric* accumulated in the water, part of which paſſes into our body.

(170.) The feeling, or perception of caloric, is not like that of light, confined to a particular organ curiouſly conſtructed for its reception; but is extended over the whole body, and takes place wherever the nerves are diſtributed, and retain their energy.

(171.) Concerning the *nature* of caloric, two opinions have chiefly divided philoſophers. Some thought caloric to be, like gravity and elaſticity, not a ſubſtance, but a quality or property of bodies. They ſuppoſed it to conſiſt in a peculiar vibration, or elaſtic motion among the particles of matter. Later diſcoveries have confirmed the opinion that it is a diſtinct material ſubſtance; though reſpecting the nature of this ſubſtance opinions are ſtill divided. Profeſſor Leſlie (p. 162.) by a very ingenious proceſs of reaſoning, arrives at this concluſion "that heat is only light in a ſtate of combination." His principal argument is, that when bodies are expoſed to the ſun's rays, their increaſe of heat is proportioned to the quantities of light abſorbed. Thus a black body, which abſorbs moſt of the rays, becomes much ſooner hot than a white body which repels moſt of them; and a metallic ſpeculum does not become ſenſibly hot, becauſe it abſorbs few or none of the rays.

(172.) Though caloric poſſeſſes ſome properties in common with thoſe of light, yet in ſome it differs, and exhibits properties peculiar to itſelf. That ſome difference exiſted between theſe ſubſtances, has long been ſuſpected, from the following facts. The light of the moon does not produce any ſenſible heat, though concentrated ſo as to be of equal denſity with that of the ſun. It has been long known that a glaſs mirror, placed before the fire, reflects the rays of light; but not thoſe of caloric; whereas a metallic mirror reflects both. That the glaſs mirror becomes hot; while the metallic mirror remains at its former temperature. It has been long known that a pane of glaſs, placed before the fire, tranſmits the light, but retains the caloric until it acquires the temperature of the medium in which it is placed: and then ſends forth caloric by radiation from itſelf. Hence cooks and others who occaſionally expoſe themſelves to a hot fire, often defend their faces, during ſuch operations, by interpoſing a pane of glaſs betwixt their faces and the fire. Hence alſo thoſe who operate in making bar iron and other metallurgic proceſſes, cover themſelves with a leather maſk, furniſhed with glaſs goggles, which permit them to ſee diſtinctly what they are doing, but keep back the heat during each operation. Theſe facts were long known to common workmen before they attracted the notice of philoſophers.

(173.) But the moſt deciſive proof of a difference ſubſiſting between heat and light, is a late diſcovery of Dr Herſchel. He examined the heating power of the different coloured rays in the priſmatic ſpectrum, by means of a thermometer on which each of the rays was made to act in ſucceſſion, while two other thermometers on which the rays did not act, ſerved as ſtandards with which their heat might be compared. He found their heating power to be in the inverſe order of their refrangibility; the violet having the leaſt, and the red the greateſt heating power. Taking the center, and the extremes of the ſpectrum, their heating powers were to each other as the following numbers:

Violet = 16
Green = 22·4
Red = 55

What is ſtill more remarkable, the heatiag power did not ſtop at the utmoſt limit of the red ray; for, on ſhifting the thermometer beyond it, though ſtill in the line of the ſpectrum, it continued to riſe until it was half an inch beyond the red ray, where it was higher than in the red ray itſelf. Beyond this the thermometer began to fall; tho' the power of heating continued to be ſenſible at the diſtance of 1½ inch beyond the utmoſt limit of the red ray.

(174.) Theſe important experiments were repeated at the Royal Inſtitution, by Sir Henry Engelfield and others, with an apparatus conſtructed on purpoſe to obviate objections which had been made to Dr Herſchel's couclufions. When the bulbs of the thermometers were blackened, the following Table exhibits the reſult.

Thermometer in the
blue ray roſe in 3 minutes from 55° to 56°
green - - - 3 - - - - - - 54 - 58
yellow - - 3 - - - - - - 56 - 62
full red - - 2½ - - - - - - 56 - 72
confines of red 2½ - - - - - - 58 - 73½
beyond the viſible light 2½ - - - - - - 61 - 79

A thermometer, whoſe bulb was blackened, roſe more in the ſame circumſtances than one whoſe bulb was naked or covered with white paint; as may appear from the following

Table.

		Time	roſe from	to
Red Ray	Black Therm.	3′	58°	61°
	White Therm.		55	58
Dark	Black Therm.	3	59	64
	White Therm.		58	58½
Confines of red	Black Therm.	3	59	71
	White Therm.		57½	60½

(175.) Dr Herſchel aſcertained that no rays of caloric are to be found beyond the violet end of the ſpectrum. They found that all the rays of the ſpectrum poſſeſſed the power of heating; though this power was ſtrongeſt beyond the red ray. When the rays of caloric immediately beyond the red ray were collected by a lens, a faint bluſh of red was ſeen; which was aſcribed to a ſmall mixture of the red rays among thoſe of caloric. It follows as an evident conſequence from theſe experiments that there are rays which poſſeſs the power of heating, which are not viſible to the ſight; that theſe are leſs refrangible than the viſual

ſual rays; and that the heating power of the viſible rays muſt be aſcribed to a mixture of the heating rays among them. They hence think the following concluſion to be clearly eſtabliſhed—That the ſun projects three kinds of rays, which, in the order of their refrangibility, are as follow, 1ſt, the deoxidizing; 2d, the colorific; 3d, the calorific rays. That theſe different rays, poſſeſſing properties ſo very different from each other, muſt be regarded as differing eſſentially in their compoſition, or genus of matter.

(176.) Without pretending to offer any deciſion concerning theſe very curious and intereſting diſcoveries, we humbly apprehend that the phenomena of the calorific rays may be explained in conſiſtency with Mr Leſlie's theory. He ſhews that light is much obſtructed in its paſſage through the atmoſphere, and that much of it is loſt, or ceaſes to be light. There is no extravagance in ſuppoſing that this portion, or a part of it, may combine with atmoſpheric matter, and form caloric. It would appear that the particles formed by this union are more denſe than thoſe of the original light; and if refrangibility varies according to the momenta of the moving particles, as conjectured, (151,) it ſhould follow that the compounded, or calorific rays ſhould be leſs refrangible than the ſeveral colorific rays which enter into their compoſition. It appears, however, that each of the colorific rays enters into the compoſition of the calorific rays, and conveys to the latter various degrees of refrangibility correſponding to that which each ray originally poſſeſſed. Hence, tho' the calorific rays be leſs refrangible than their ſeveral component colorific, and their greateſt intenſity be beyond the red ray of the ſpectrum, a mixture of the calorific is found among each of the colorific rays, increaſing in intenſity from the violet to beyond the red.—Theſe are only offered as conjectures, whoſe object is to ſhew that the phenomena may be accounted for without an unneceſſary multiplication of the primary or elementary bodies. But if they have any foundation, it will appear that our philoſophic alarms about our lower planets, Venus and Mercury, being expoſed to ſuch an intenſe heat as muſt diſſipate their ſubſtance in vapour; and our higher planets, the Georgian for example, being expoſed to ſuch intenſe cold as is inconſiſtent with animation, need not give us much uneaſineſs. The temperature of the planets will appear to be not in the inverſe ratio of their diſtances from the ſun; but in the compound ratio of the depths of their atmoſpheres, and of their affinity for light, reſpectively.

(177.) Dr Herſchel aſcertained that not only the caloric contained in the ſun's rays, is refrangible; but alſo that which is emitted by common fires, by candles, by hot iron, and even by hot water.

(178.) But the rays of caloric are not only refracted by tranſparent bodies; they are alſo reflected by poliſhed ſurfaces in the ſame manner as the rays of light. While light and heat were conſidered as the ſame ſubſtances, it was long known that bodies might be burned, or fuſed, or diſſipated in vapour, in the focus of a concave ſpeculum, as well as in that of a convex lens. But that caloric, without being accompanied with light, is reflected from poliſhed ſurfaces, was aſcertained by Mr Scheele, Mr Pictet, Dr Herſchel, and others.—Mr Pictet having placed two concave tin mirrors at the diſtance of twelve feet from each other; a ball of iron heated ſo as not to be viſible in the dark was placed in the focus of one mirror, and the bulb of a thermometer in the other. In ſix minutes the thermometer roſe 22°; and a lighted candle being put in the place of the ball, produced nearly the ſame effect. When a piece of clear glaſs was interpoſed between the candle and the thermometer, the latter ſunk in nine minutes 14°; though the light which fell on the thermometer did not ſeem to be diminiſhed: and when the glaſs was removed, it roſe again, in ſeven minutes, about 12°. Here it was evident that the glaſs intercepted the caloric, while it tranſmitted the light. When a glaſs matraſs holding 2044 grains of boiling water, was ſubſtituted for the iron ball, and a ſcreen of ſilk, which had been placed between the mirrors, was removed, the thermometer ſuddenly roſe from 47° to $50\frac{1}{3}$°, and deſcended again when the matraſs was removed from the oppoſite focus.

(179.) Mr Pictet improved upon theſe experiments by employing a ſenſible air thermometer, every degree of which was equal to about $\frac{1}{11}$th of a degree of Farenheit. With a view to aſcertain the velocity of caloric, he placed two concave mirrors, the one of tin as before, the other of plaſter gilt, and 18 inches in diameter, at the diſtance of 69 feet from each other. In the focus of the tin mirror there was placed a heated ball of iron, with a thick ſcreen before it, to intercept the caloric, and the bulb of an air thermometer in the focus of the other mirror. As ſoon as the ſcreen was removed, the thermometer roſe, without any ſenſible interval: and hence he concluded that the motion of caloric through 69 feet is too rapid to be meaſured. The experiments of Mr Leſlie lead to a concluſion that caloric moves with the ſame velocity as ſound. Perhaps its velocity may vary with circumſtances. Being highly elaſtic, we would naturally expect that the more it is accumulated in a body, the more rapidly it ſhould move from it; and when it moves in conjunction with light, it ſeems to move with the ſame rapidity as this ſubſtance.

(180.) The motion of caloric being very rapid, its particles muſt be very minute; though probably more denſe than thoſe of light. A queſtion has been much agitated, whether an addition of caloric increaſes the weight of bodies? From the experiments of De Luc, Fordyce, Morveau, and Chauſſier, it would appear that inſtead of increaſing in weight, bodies become lighter on being heated.

(181.) Mr Fordyce took a ball of glaſs three inches in diameter, with a ſhort neck, weighing 451 grains, and poured into it 1700 grains of water, and ſealed it hermetically. The whole, at the temperature of 32°, weighed $2150\frac{11}{16}$ grains. Being put into a freezing mixture of ſalt and ſnow, until part of the water was frozen; wiped clean and dry, and again weighed in a balance which marked the $\frac{1}{1000}$th part of a grain, it was found to be $\frac{1}{60}$th of a grain heavier than before. When the whole water was frozen, and the globe was reduced to the temperature of 10°, it was $\frac{1}{10}$ths of a grain heavier than when its contents were fluid. As water gives out much caloric during its freezing, the globe ſhould have become lighter, in place of heavier; but we are diſpoſed to aſcribe its increaſe of weight to the contraction of its bulk, which rendered it leſs buoyant in the air. A ball of feathers, wool, or other ſoft ſubſtance, which balances a piece of lead in the air, will become heavier than the latter in an exhauſted receiver, or if compreſſed into a ſmaller bulk.—From the experiments of Lavoiſier, and of Count Rumford, it ſeems to be decided, that neither the addition nor ſubtraction of caloric from bodies, occaſions any ſenſible alteration in their weight; a proof of the extreme minuteneſs of its particles.

(182.) The particles of caloric are never found adhering together in maſſes, but ſeem to repel each other with great force. To this we may aſcribe its elaſticity, and its tendency to fly off from bodies where it is accumulated in all directions: and alſo its effects in expanding and liquifying bodies; and likewiſe in cauſing them to fly off in vapour.

(183.) That heat radiates, or flies off in all directions, from bodies in which it has been accumulated, has long been obſerved; but it was profeſſor Leſlie who firſt obſerved that varying the ſurface of bodies occaſioned variations in the rapidity with which a body parted with caloric, and ſeveral intereſting phenomena reſpecting its motions.†

(184.) He filled a bright globe of tin, four inches in diameter, and having a narrow neck, with warm water, and placed it on a ſlender ſupport in a warm room without a fire. A thermometer inſerted in this globe, ſunk half way from its original temperature to that of the room, in 156 minutes. The ſame ball being covered with a thin coat of lamp black, cooled to the ſame temperature in 81 minutes. Here the rate of cooling was nearly doubled by the ſuperficial coating of lamp black.

(185.) Count Rumford uſed two cylindrical braſs veſſels, of the ſame ſize and ſhape, and both filled with water of the ſame temperature; but one of the veſſels was coated with Iriſh linen. The naked veſſel cooled 10° in 55 minutes; but the one covered with linen cooled 10° in 36½ minutes. The ſame acceleration took place when the veſſel was coated with glue, with black or white paint, or when ſmoked with a candle.—Here what we would not have expected took place, that an additional covering, inſtead of retarding, accelerated the emiſſion of caloric.

(186.) The variations in the rate of cooling are greateſt when the air around the veſſels is perfectly ſtill. When the air is violently agitated, and rapidly changed, the times in which the coated and uncoated veſſels cool, approach to equality. Thus Mr Leſlie expoſed two globes, the one clear, the other coated with lamp black, to the wind, and found the times in which they loſt half their heat to be as follow:

	Clean globe.	*Blackened globes*
In a gentle gale -	44 min.	35 min.
In a pretty ſtrong breeze	23	20½
In a vehement wind	9·5	9

(187.) This muſt have been owing to the air which paſſed along the bodies combining with the caloric, and ſhews that coating the veſſels chiefly promotes the diſcharge of heat by radiation.

(188.) When a cubical caniſter of tin, of conſiderable ſize, and filled with hot water, is placed at the diſtance of a foot or two from a bright concave mirror of tin, a delicate thermometer, placed in the focus of the mirror, undergoes a certain elevation. The thermometer riſes much higher when the caniſter is coated with lamp-black, than when it is bright. Hence more caloric radiates from the black, than from the clear metal. But as a common thermometer is liable to be affected by changes in the temperature of the room, Mr Leſlie has invented what he calls a *differential thermometer*, to which we are indebted for the remarkable preciſion of his experiments.

(189.) It conſiſts of a glaſs tube bent into the ſhape of the letter U, and terminating on each end in a ſmall hollow ball. The greateſt part of the bent tube is filled with ſulphuric acid tinged red with carmine, while the balls, which communicate with the intermediate tube, are full of air. To one leg of the tube is affixed a ſmall ivory ſcale, divided into 100 degrees, and the ſulphuric acid is ſo diſpoſed, that when in *equilibrio*, its upper ſurface ſtands oppoſite to the part of the ſcale marked 0. The glaſs ball on the leg which has no ſcale, is diſtinguiſhed by the name of the *focal ball*. When this inſtrument is placed in a room, both balls being equally expoſed to heat, the expanſion of the air in one ball, balances that in the other, and no change is indicated. But if the *focal ball* be placed in the focus of a mirror, or in any point where more heat is accumulated than in parts adjacent, the air in the *focal ball* will be expanded, and preſs the ſulphuric acid up the oppoſite leg of the tube towards the cold ball; where the ſcale will indicate the difference of heat.

(190.) In making experiments on the radiation of heat, Mr Leſlie uſed hollow cubes of tin, varying from three to ten inches in ſize, filled with hot water, placed before a tin reflector, which had the differential thermometer in its focus. The reflector was of a parabolic figure, and about 14 inches in diameter. To aſcertain the effect of different ſurfaces in radiating heat, it was only neceſſary to coat the caniſter with the body whoſe ſurface was to be tried, while the differential thermometer, in the focus of the reflector, indicated the proportional radiation of each ſurface. The caniſter had a centigrade thermometer inſerted into it to mark the heat of the water.—The following are the principal reſults.

191.) The nature and poſition of the caniſter being the ſame, its effect upon the differential thermometer (Inquiry, p. 14.) is "exactly proportioned

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† *Though Count Rumford publiſhed a Diſſertation in the Philoſophical Tranſactions, ſoon after Mr Leſlie's work appeared, containing ſimilar experiments to his, yet he ſeems clearly entitled to priority in theſe diſcoveries.*

tioned to the heat of the caniſter, or the difference of its temperature to that of the room."

(192.) The temperature of the caniſter being the ſame, its effect on the differential thermometer diminiſhes, as the diſtance of the caniſter increaſes. Thus if the thermometer indicate 100°, when the caniſter is diſtant three feet; it will amount only to 57° when the caniſter is removed to ſix feet. When a large glaſs mirror was uſed inſtead of the reflector, and a charcoal fire in place of the caniſter, the fire being at the diſtance of ten feet, the thermometer roſe 37°, and at the diſtance of 30 feet, it roſe 21°. It appears that the effect upon the thermometer is nearly in the inverſe proportion of the diſtance of the caniſter from the reflector. When caniſters of different ſizes are uſed, and ſo placed that they all ſubtend the ſame angle at the reflector, their effect upon the thermometer is nearly the ſame. Thus a caniſter of

3 inches ſquare,	3 feet diſtance,	raiſed therm.	50°
4 inches —	4 feet —	— —	54
6 inches —	6 feet —	— —	57
10 inches —	10 feet —	— —	59

Hence the heat is nearly proportional to the angle ſubtended by the radiant ſurface; and the radiated heat ſuffers no ſenſible diminution during its paſſage through the air.

(193.) Though heat be radiated from a hot body in all directions, Mr Leſlie has ſhewn that the radiation is moſt copious in the direction which is perpendicular to the ſurface of the hot body. An oblique poſition of the caniſter diminiſhes the effect, and the diminution is proportioned to the obliquity. The effect in all poſitions is proportional to the viſual magnitude of the caniſter as ſeen from the reflector, or to its orthographic projection. Hence the action of a heated ſurface is proportional to the ſine of its inclination to the reflector.

(194.) To aſcertain the radiating power of different ſubſtances, one ſide of the caniſter was covered with a coating of various ſubſtances in ſucceſſion, and their relative radiating power, as marked by the differential thermometer, is as follows:

Lamp black,	100°
Water by eſtimate,	100+
Writing paper,	98
Roſin,	96
Sealing wax,	95
Crown glaſs,	90
China ink,	88
Ice,	85
Minium,	80
Iſinglaſs,	80
Plumbago,	75
Tarniſhed lead,	45
Mercury,	20+
Clean lead,	19
Iron poliſhed,	15
Tin plate,	12
Gold, ſilver, copper,	12

From this table it appears, that lamp black radiates moſt, and metals radiate leaſt of all the ſubſtances tried. Count Rumford found that all the metals radiated equally; but Mr Leſlie's experiments are moſt likely to be accurate, which make a conſiderable difference in the radiating power of ſome metals.

(195.) The ſubſtance continuing the ſame, its power of radiating is conſiderably altered by a ſlight change upon its ſurface. Thus bright poliſhed metals radiate leaſt of any ſubſtances, but if their ſurfaces be tarniſhed, or oxidized, their radiant power is much increaſed. The table ſhews that bright lead only radiates as 19°; but tarniſhed lead as 45°. The ſame change happens to tin, and to all the metals tried. When the ſmoothneſs of a metallic ſurface is deſtroyed, by rubbing it in one direction with fine ſand paper, its radiating power is increaſed from 12° to 22°. But if theſe parallel furroughs be croſſed by others, the radiating power is again ſomewhat diminiſhed.

(196.) The radiating power of the different ſubſtances being tried by ſpreading a thin coat of each upon one ſide of the caniſter, it was next examined whether the thickneſs of this coat occaſioned any difference in the radiating power. On one ſide of a caniſter was ſpread a thin coat of liquid jelly, and four times the quantity upon another. Both dried into thin films; and the radiation of the thinneſt was 38°, that of the other 54°. The augmentation continues until the thickneſs of the coat of jelly or oil amounts to about $\frac{1}{1000}$th part of an inch, after which it remains ſtationary. In this way the radiation of metallic ſurfaces was increaſed by covering them with various ſubſtances: but when a caniſter was uſed one ſide of which was plate glaſs, which radiates 90°; the thinneſt covering of gold, ſilver, and copper leaf, reduced the radiation to 12°; the ſame as would have been produced from thick coats of theſe metals.

(197.) It was ſtated that a ſide of the tin caniſter coated with lamp black, acting on the focal glaſs ball, raiſed it to 100°; but if the focal glaſs ball be coated with ſmooth tin-foil, it only raiſes it to 20°. A bright ſide of the tin caniſter raiſes the naked focal ball to 12°; but it only raiſes this coated ball to 2½°. Hence a metallic ſurface not only radiates heat worſe than glaſs, but is leſs capable of imbibing it, when its rays ſtrike againſt it. When the tin coating of the focal ball is rubbed with ſand paper, the effect is conſiderably increaſed. Hence the ſurfaces which radiate heat moſt powerfully, likewiſe abſorb it moſt abundantly.

(198.) The reverſe of this is the caſe with regard to *reflectors*, thoſe bodies which *radiate* heat moſt powerfully, reflect it moſt feebly; and thoſe which are the moſt feeble *radiators*, are the beſt *reflectors*. It follows, of courſe, that metals are the beſt reflectors of caloric; and that glaſs, which radiates more powerfully than metals, reflects more feebly. When a concave glaſs mirror was uſed inſtead of one of tin, (Inquiry, p. 21.) the effect on the focal ball was hardly 1°. The effect continued the ſame when the ſilver was removed from the back of the mirror, and when the poliſh of the latter was deſtroyed by rubbing it with emery or ſand. But when its face was covered with tin-foil, its effect was 10°; and when covered with lamp black, all effect ceaſed. Hence Mr Leſlie infers that caloric is reflected entirely from the external ſurfaces of bodies.

(199.) To aſcertain the reflecting energies of different ſubſtances, ſmooth plates of them were placed before the concave tin reflector, within the focus, and ſo adjuſted as to throw the rays into a new focus, upon the focal ball, between theſe plates and the reflector. The comparative power of the ſubſtances tried was as follows:

Braſs,	100
Silver,	90
Tinfoil,	85
Planiſhed block tin,	80
Steel,	70
Lead,	60
Tinfoil ſoftened by mercury,	50
Glaſs,	10
Do. coated with wax or oil,	5

The power of the reflector is much diminiſhed by rubbing its ſurface with ſand paper. When the concave ſurface of the tin reflector was ſmeared with jelly, and dried, its power being 100°, was diminiſhed according to the following degrees of thickneſs of the coating of jelly,

Thickneſs of coating in parts of an inch.	*Effects of Reflection.*
$\frac{1}{20000}$	77°
$\frac{1}{10000}$	49
$\frac{1}{5000}$	37
$\frac{1}{2000}$	27
$\frac{1}{1000}$	19

When iſinglaſs was employed to coat the ſpeculum, its original effect being equal to 127 degrees, its diminution of reflecting power, with various thickneſs of coating, was as follows:

Thickneſs of coating in parts of an inch.	*Effect.*
$\frac{1}{200000}$	98°
$\frac{1}{100000}$	93
$\frac{1}{50000}$	87
$\frac{1}{20000}$	61
$\frac{1}{10000}$	39
$\frac{1}{5000}$	29
$\frac{1}{2000}$	21
$\frac{1}{1000}$	15

Taking the reflecting power of iſinglaſs to be equal to 8, Mr Leſlie proceeds to ſtate the power exerted by the metallic ſurface under coatings of various thickneſs.

Thickneſs of the film in millionth parts of an inch.	*Influence of ſubſtratum of tin.*
$1\frac{1}{2}$	90°
10	85
20	79
50	53
100	31
200	21
500	13
1000	7

From theſe facts it follows that the power of *reflecting*, is inverſely as the power of *radiating* caloric.

(200.) Mr Leſlie diſcovered that, in common caſes, air is the medium through which heat is radiated, and that it moves by pulſations ſomewhat ſimilar to the motion of ſound. When the apparatus was immerſed in water, no ſenſible radiation was obſerved; and hence he concludes that a heated body cannot radiate except it be placed in an elaſtic medium. The different gaſes tried by Mr Leſlie appeared to admit heat to be radiated through them equally well as air; and it was found that the rarefaction of air ſomewhat diminiſhes the energy of radiating ſurfaces, as it does the propagation of ſound. This diminution from rarefaction varied in the different gaſes. He alſo ſhews that the energy of radiating ſurfaces is in proportion to their attraction for air; or to the nearneſs which they admit air to approach them.

(201.) The effect of ſcreens interpoſed between the radiating ſurface and the focus of the reflector, Mr Leſlie has alſo aſcertained with his uſual ſagacity. Theſe ſcreens operate in three ways: 1. By their diſtance from the hot caniſter; 2. By their thickneſs; 3. By the nature of their ſubſtance.

(202.) *Firſt.* A ſcreen diminiſhes the effect upon the differential thermometer, ſituated in the focus of the reflector, in proportion to its diſtance from the hot caniſter. Thus if the caniſter be three feet from the reflector, its ſide painted with lamp black will radiate 100°. But if a pane of glaſs be interpoſed at the diſtance of two inches from the caniſter, the radiation will be reduced to 20°. If the glaſs be moved ſlowly towards the reflector, the effect of radiation will gradually diminiſh on the thermometer. When the pane of glaſs has reached one foot from the caniſter, or two from the reflector, the effect of radiation on the focal ball will hardly be perceptible.

(203.) *Second.* If a thin board of wood be interpoſed at the diſtance of two inches from the caniſter, the radiation will be intercepted in proportion to the thickneſs of the board; as follows—

Board $\frac{1}{8}$ of an inch thick—effect	20°
$\frac{1}{8}$ inch	15
1 inch	9

(204.) *Third.* If a ſheet of tinfoil, however thin it may be, is ſubſtituted in place of the glaſs, or board, the radiation is entirely intercepted, and the differential thermometer is reduced to 0. When gold leaf, not exceeding the $\frac{1}{100000}$th part of an inch in thickneſs, and which admits light to paſs through it, is ſubſtituted in place of the tinfoil, the radiation of heat is alſo completely intercepted. When a ſheet of white paper is uſed as a ſcreen, the effect on the focal ball is 23°.

(205.) Theſe ſcreens ſeem to operate by firſt abſorbing, and then radiating the heat from their ſubſtance. Hence it appears that thoſe bodies which reflect heat moſt, abſorb it leaſt, and radiate moſt feebly; and that the power of intercepting heat is inverſely as the power of radiating it.

(206.) That the power of abſorbing heat depends upon the *ſurfaces* of bodies, was aſcertained by Mr Leſlie in the following manner. Two panes of glaſs being coated each on one ſide with tinfoil, and the other ſide left bare, were preſſed together with their naked ſides in contact, and uſed as a ſcreen at two inches diſtance from the caniſter. The whole rays were intercepted, as no effect was produced upon the focal ball of the thermometer. But when the tinned ſides of the panes were applied to each other, and the glaſſy ſides were outermoſt, the effect was equivalent to 18°. Here the very ſame material, according to the ſurface expoſed, exhibited different effects. The tin ſurface intercepted all the rays; while the glaſſy ſurface allowed nearly $\frac{1}{5}$th of them to paſs on to the reflector. Two thin plates of tin, each having one of its ſurfaces painted with a thin coat of lamp black, had their clear ſides applied to each other, and were uſed as a ſcreen as before. The effect on the differential thermometer was 23°. When the blackened ſides of the plates were applied to each other, no effect was produced. Either of the plates being removed, the thermometer roſe nearly 4°. When the two tinſides were applied to each other, and their blackened ſides facing the one the caniſter, the other the reflector, the effect being 23°; if one of the plates be moved in a parallel poſition two inches nearer to the reflector, all effect ceaſes.

(207.) Radiation is common both to heat and light, and this circumſtance has led philoſophers to reckon them one and the ſame ſubſtance. But the facts adduced by Mr Leſlie prove that there is a material difference between the radiation of heat and light, and hence lead to a concluſion that theſe ſubſtances differ from each other. Light paſſes through a tranſparent body, as glaſs, without any great diminution of its intenſity; and the effect is the ſame in whatever part of its courſe the glaſs is placed. But it has been ſeen that unleſs the pane be placed very near the caniſter, or radiating body, the heat is nearly intercepted, and is wholly intercepted when the pane is moved to a certain diſtance from the caniſter, and nearer to the reflector. The intenſity of radiated heat is nearly inverſely as the diſtance from the radiating body; the intenſity of light is inverſely as the ſquare of the diſtance. It is evident that the heat does not paſs through ſolid bodies, when uſed as ſcreens, in the form of rays. That they merely imbibe a portion correſponding to the intenſity at the diſtance where they are placed, and afterwards radiate correſponding to the exceſs of their temperature above that of the ſurrounding atmoſphere. In this caſe the ſcreens, however thin, become as caniſters of diminiſhed temperature; and in this reſpect the radiation of heat differs very much from that of light, which paſſes through tranſparent bodies without much diminution of quantity. It appears too, that air is the medium of the radiation of heat, and that it is conveyed by ſucceſſive impulſes, ſimilar to ſound. That glaſs radiates better than metals, becauſe it admits air to come nearer to its ſurface; and that the radiation of metals is increaſed by ſcratching their ſurfaces, which increaſes the volume of air in contact with them. That thoſe bodies which radiate beſt, alſo imbibe heat moſt, becauſe they allow the heated pulſe of air to come neareſt their ſurface.

(208.) But there are ſeveral other particulars in which the properties of caloric differ from thoſe of light. Though heat cannot be made to *radiate* through ſolid bodies, it paſſes through or is *conducted* by all bodies.

(209.) That heat is *conducted*, or paſſes through bodies, and with various degrees of rapidity, cannot have eſcaped the moſt careleſs obſerver. Thus, if we heat the ends of a bar of iron, and of wood red hot, we can hold the wooden bar much nearer to the ignited part, than the iron, without feeling pain. This ſhews that both bodies conduct heat; but that the iron conducts more rapidly, and to a greater diſtance than the wood. If the bar of iron be twenty inches long, and have one end put in the fire, while a thermometer is applied to the other end, it will be 4 minutes before the thermometer begins to aſcend, and 15 minutes by the time it has riſen 15°. Hence caloric requires 4 minutes to move through iron to the diſtance of 20 inches; and 15 minutes to accumulate at this diſtance to the intenſity of 15°. We ſhall ſee that it is only in this ſlow manner that heat paſſes through all ſolid and non-elaſtic bodies; and though it may be radiated through elaſtic bodies, it may alſo be conducted through them in the ſame way as through ſolids.

(210.) Caloric moves through bodies with various degrees of velocity, and bodies are hence called *good* or *bad conductors of caloric.* It is hence evident that caloric muſt be attracted, or have an affinity for bodies.

(211.) When caloric begins to penetrate a body, it may be conſidered as compoſed of an infinite number of layers, or ſtrata, each of which have an equal attraction for caloric. When the firſt ſtratum combines with a portion of caloric, it is detained there by the affinity of the ſtratum for caloric. But if it continues to receive ſucceſſive additions of caloric, the affinity for caloric is perpetually diminiſhed, and the exceſs paſſes over to the ſecond ſtratum. This ſtratum being heated to exceſs, a part is attracted by the third ſtratum: and thus the caloric advances through the body, from ſtratum to ſtratum, each ſtratum diminiſhing in intenſity according to its diſtance from the one at which the heat entered. Here the cauſe of retardation in the progreſs of the caloric is its attraction for the body. The ſtronger this attraction, the more ſlowly it advances, and the body is ſaid to be a bad conductor. But if its attraction for a body be feeble, ſo, in proportion, the elaſticity of caloric will carry it more rapidly through the body, and to a greater diſtance from the ſtratum at which it entered. In this caſe, the body will be pronounced a good conductor of caloric. Thus, if an iron rod have one end put into the fire, the hotteſt part is that which is in contact with the fire, and the heat diminiſhes in intenſity towards the other extremity, until no increaſe of temperature can be perceived to reſult from the conducting power of the rod. An increaſe of temperature will cauſe the caloric to advance to a greater diſtance along the rod, and this has no other limit but the change of ſtate in the heated body. Thus the extremity of the rod may be melted, and no addition of caloric, beyond this, will cauſe the rod to conduct the heat to a greater diſtance. Thus ice, by a certain quantity of caloric is changed into water; and by a greater quantity, is raiſed into vapour. Metals, by a certain addition of caloric, may be melted, volatilized, or changed into oxides. Wood and combuſtibles take fire and are diſſipated. When the firſt ſtratum of a body, therefore, arrives at the temperature at which its ſtate is changed, the farther conducting power of that body is at an end.

(212.) The conducting power of bodies ſeems to depend in a conſiderable degree upon their denſity; the denſeſt bodies being, in general, the beſt conductors. But this obſervation is modified by the ſpecific affinity of bodies for caloric, the ſtrength of affinity, as was obſerved, tending to counteract the conducting power of bodies. Thus metals, as they are the denſeſt bodies with which we are acquainted, conduct at a greater rate than others; though ſome metals of inferior, conduct better than others of greater denſity. When bodies are arranged in claſſes, the individuals of any claſs do not always conduct in proportion to their denſity; for the reaſon already aſſigned.

(213.) All *ſolids* are conductors, becauſe they may imbibe certain portions of caloric before they change their ſtate. This is the caſe with earths and ſtones; alſo with metals, vegetables, and animal ſubſtances. The conducting power of bodies is limited by the temperature at which they change their ſtate. Thus ſulphur at 60° is a conductor; but at 214° the point at which it melts, or is volatilized, it ceaſes to be a conductor. Ice is a conductor; but when heated to 32° it ceaſes to be a conductor, becauſe farther additions of heat ſerve only to convert it into water.

(214.) *Liquids* and *gaſeous* bodies, are alſo conductors, as they can be heated without any apparent change of ſtate. But there is this difference between the heating of liquids and ſolids, that the particles of the former having a free motion among each other, produce an equal diſtribution of the caloric, independent of their conducting power. Liquids and gaſes being expanded by heat, the particles which are firſt heated, are preſſed upwards by the deſcent of the other parts of the maſs; which receiving heat in their turn, are again moved upwards by the deſcent of the ſurrounding fluid. Thus, an internal motion is excited which conveys the caloric to a much greater diſtance in fluids and gaſes, and produces a more equal diſtribution of it, than could be effected by the conducting power of theſe bodies.

(215.) There is therefore a very great difference in the effect when heat is applied to the ſurface of liquids, from what takes place when it is applied to the bottom or ſides. When the heat is applied at the ſurface, it can only penetrate a liquid by its *conducting* power. But when applied at the bottom, the parts which firſt receive the heat fly upwards; while the colder parts ſink down, and receiving heat, aſcend in their turn. Thus all the parts of a liquid come rapidly in contact with the ſource of heat, and the heat is ſuddenly *carried*, or *tranſported* through the whole maſs of liquid, until the whole becomes of the ſame temperature. If the liquid receive continual additions of heat, it begins to change its ſtate, and to riſe in vapour. The elaſtic vapour, generated at the bottom where the heat is applied, in its aſcent agitates the whole maſs, and produces the effect called *boiling*; beyond which the temperature of the liquid cannot be increaſed in open veſſels.

(216.) The *carrying* power of fluids was firſt attentively examined by Count Rumford; and he was led to conclude, that fluids acquire heat by its means alone, and that they are deſtitute of the power of conducting heat. Having filled a large thermometer, whoſe bulb was four inches in diameter, with alcohol which contained numerous particles of duſt, it was heated as much as the liquid could bear without boiling. Being placed in a window to cool, through which the ſun was ſhining, the particles of duſt, being illuminated by the ſun, diſcovered that the whole liquid in the tube of the thermometer was in a moſt rapid motion; there being an aſcending current in its axis, and a deſcending current along its ſides. On cooling the tube with ice, the rapidity of the currents was much increaſed. As the liquor cooled it diminiſhed, and the motion ceaſed entirely when it acquired the temperature of the room. It is obvious that theſe currents were cauſed by the particles next the ſides of the tube being firſt cooled, and thus becoming ſpecifically heavier, they ſank down, and preſſed upwards the liquor at the centre, which was always warmer, and of courſe, lighter than the liquor at the ſides. When the thermometer was filled with linſeed oil, the ſame reſult was obtained.

(217.) As this internal motion among the particles of fluids can only be obſerved in conſequence of having minute particles of ſolid bodies mixed with them, which are of the ſame ſpecific gravity with themſelves; to aſcertain whether water be liable to this internal motion, Count Rumford diſſolved potaſh in it, until its ſpecific gravity was exactly the ſame with that of amber. A number of ſmall pieces of amber being put into this ſolution, and the whole put into a glaſs globe with a long neck, heated, and expoſed to cool, the ſame phenomena were exhibited as with other fluids. A change of temperature, of only a few degrees, ſet the currents a-flowing; and a motion was always produced by a hot or a cold body applied to any part of the veſſel. A hot body cauſed the neareſt part of the fluid to aſcend; but a cold body cauſed it to deſcend.

(218.) Theſe diſcoveries led Count Rumford to try whether the heating and cooling of fluids might not be retarded by any thing which diminiſhes the fluidity of theſe bodies. Having conſtructed a large linſeed-oil thermometer, with a copper bulb and glaſs tube; the bulb was placed exactly in the centre of a braſs cylinder, and kept in its place by means of four wooden pins projecting from the bottom and ſides of the cylinder, and by the cork ſtopper of the cylinder through which the tube of the thermometer paſſed. The cylinder being filled with pure water, incloſing the thermometer, was held in melting ſnow until the thermometer ſank to 32°, and was immediately plunged into a veſſel of boiling water. The thermometer roſe from 32° to 200° in 507 ſeconds. It is obvious the caloric which raiſed the thermometer in this poſition, muſt have paſſed through the water which ſurrounded it in the cylinder. This water, amounting to 2276 grains, had now 192 grains of ſtarch boiled in it, which rendered it much leſs fluid; and the thermometer required 1109 ſeconds to riſe from 32° to 200°. A ſimilar reſult was alſo obtained when 192 grains of eider-down were mixed with the water, which could only ſerve to embarraſs the motion of the particles. The communication of heat was alſo retarded when ſtewed apples were put into the cylinder. Hence it appears that whatever retards the motion among the particles of fluids, impedes alſo the communication of caloric through them—as may appear by the following tables.

Time the caloric took in paſsing into the Thermometer.

Temperature.	Thro' the water and Starch.	Thro' the water and Eider-down.	Thro' ſtewed Apples.	Thro' pure water.
Therm. roſe from 32° to 200° in	Seconds. 1109	Seconds. 949	Seconds. 1096½	Seconds. 597
Therm. roſe 80° viz. from 80° to 160° in	341	269	335	172

Time the caloric was in paſsing out of the Thermometer.

Temperature.	Thro' the water and Starch.	Thro' the water and Eider-down.	Thro' ſtewed Apples.	Thro' pure water.
Therm. fell from 200° to 40° in	Seconds. 1548	Seconds. 1541	Seconds. 1749½	Seconds. 1032
Therm. fell 80° viz. from 160° to 80° in	468	460	520	277

(219.) It follows from theſe experiments, "That the more the internal motions of liquids are impeded, the longer they are in acquiring heat; and the longer they are in throwing off their heat by means of their carrying power." The capacity of liquids to imbibe heat, therefore, is much greater by means of their carrying, than by their conducting power.

(220.) The carrying power of liquids conveys heat upwards through their maſs, but cannot convey it downwards. Yet when heat is applied at the ſurface of liquids, it gradually makes its way downwards, and the temperature of every ſtratum diminiſhes from the ſurface to the bottom. The ſame diminution of temperature in ſucceſſion from the ſource of heat, we have ſtated to take place when caloric is conducted by ſolids. We are therefore warranted to conclude that liquids are conductors of caloric.

(221.) Count Rumford indeed, has drawn a very different concluſion, and thinks that fluids are not conductors of caloric. Having fixed a cake of ice at the bottom of a glaſs jar, and covered it with ¼ of an inch thickneſs of water at 32°; on the ſurface of this was poured a conſiderable depth of boiling water, gently, ſo as not to produce a mixture of the hot and cold water. In two hours about half of the ice was melted; which ſhewed that the caloric had been conducted downwards through the cold water to the ice. But the Count thinks the fact may be accounted for by deſcending currents. It is well known that water is at its maximum denſity when its temperature is 40°, and that if it be heated above, or cooled below 40°, its denſity is diminiſhed. He thinks therefore, that when the hot water cooled down to 40°, it would ſink down through the intermediate water at 32°, and communicate its caloric by contact with the ice, and thus melt it. That the effect was produced by deſcending currents was proved by covering the ice partially with ſlips of wood, below whoſe ſhade no melting took place. In one caſe the whole ice was covered with a thin ſlip of tin, having a hole in its centre, and the ice was melted exactly under the hole, but no where elſe.

(222.) It is therefore certain, that deſcending currents took place. But the queſtion ſtill recurs, how the hot water came to be cooled down to 40°? This could not have taken place from the ſurface, which was never under 108°; nor from the ſides of the veſſel; for when the ice was covered with tin, the deſcending current was in the centre, and the partial coverings with ſlips of wood, ſhew that the currents were equal in all parts. The hot water therefore, could only have been cooled down to 40° by imparting its caloric to the cold water on which it reſted, and that again to the ice; which proves that water is a conductor of caloric. After the hot water had ſtood an hour over the ice, its temperature was as follows:

At the ſurface of the ice - -	40°
One inch above the ice - -	80
Two inches - - -	118
Three - - - - -	128
Four - - - - - -	130
Seven inches - - - -	131

Here the gradual diminution of temperature as we approach the ice, ſhews clearly that water is a conductor: nor can the fact be accounted for, by ſuppoſing that the water gives out its heat at the ſurface, and then falls down and arranges itſelf in the order of its ſpecific gravity; for here there is only a difference of one degree between the temperature at four and at ſeven inches above the ice.

(223.) Having obſerved that water which is freezed in a glaſs jar, by means of a freezing mixture applied around its ſides, firſt congeals on the ſides, and by its compreſſion forms a knob, or nipple of ice at the centre of the jar; Count Rumford took advantage of this circumſtance to aſcertain whether oil and mercury be conductors of caloric. Upon ice frozen in this manner, he poured olive oil, previouſly cooled down to 32°, until its depth was three inches above the ice; while the jar was ſurrounded as high as the ice with a mixture of ice and water. A ſolid cylinder of iron, 12 inches long, and 1·25 inch diameter, furniſhed with a cylindrical covering of thick paper, was heated to 210° in boiling water, and let down gradually into the oil, until the middle of its end was $\frac{2}{10}$ths of an inch above the knob of ice in the centre of the jar. None of the knob of ice was melted; and hence he concluded, that oil is not a conductor of caloric. The ſame reſult followed when mercury was uſed inſtead of oil.

(224.) Dr Thomſon, who repeated this experiment, aſcertained that though the knob of ice did not melt, a thermometer ſubſtituted in place of it, always roſe ſeveral degrees; and hence he drew a concluſion the reverſe of Count Rumford's, that oil and mercury are conductors of caloric.

(225.) To aſcertain the conducting power of liquids, Dr Thomſon inſtituted a ſet of experiments which appear more ſatisfactory than thoſe of Count Rumford. The liquor whoſe conducting power was to be examined, was put into a glaſs jar, with a thermometer at its bottom, its centre, and ſurface. Above this, another heated liquor, of leſs ſpecific gravity than the one to be examined, was gently poured to the ſame depth with the firſt. Here the heated liquor could not *carry* down its caloric by deſcending currents; and if the thermometers indicated an increaſe of temperature, in the lower liquid, the caloric muſt have been conducted downwards by that liquid. Thus, when boiling water was poured upon mercury, the thermometer at the ſurface of the latter immediately began to riſe, then the thermometer at the centre, and laſtly, that at the bottom. The firſt roſe to 118° in one minute, the ſecond to 90° in 15 minutes, and the third to 86° in 25 minutes. The conducting power of water was tried by pouring hot oil over it. In this way, it was aſcertained that liquids are conductors of caloric.

(226.) To prevent any of the caloric from being conducted by the veſſel, Mr Murray employed in theſe experiments veſſels of ice, which cannot conduct a greater degree of heat than 32°. Mr Dalton alſo made many experiments on a ſimilar plan; by all of which, it was aſcertained that fluids are conductors of caloric. It may hence be affirmed, that all bodies with which we are acquainted are conductors of caloric.

(227.) The next point that has engaged the attention of philoſophers, is to aſcertain the *comparative* conducting power of bodies, or the degrees of rapidity with which caloric paſſes through them. Thus if a bar of iron, and a bar of ſtone, of equal dimenſions, have their ends put into the fire, the extremity of the iron will be ſenſibly hot long before that of the ſtone. Thoſe bodies thro' which caloric paſſes rapidly are called good *conductors*; and thoſe through which it paſſes ſlowly, are called *bad conductors*. Though a knowledge of the comparative conducting powers of bodies, be of great importance, in the conſtruction of furnaces, and other uſeful purpoſes, it has not yet been aſcertained with ſufficient accuracy.

(228.) Dr Ingenhouſz procured equal cylinders of various metals, and having coated them with wax, plunged their ends into hot water; and from the length of wax coating melted on each, judged of its conducting power. From theſe experiments, he concluded that metals conduct caloric in the following order.

Silver,	
Gold,	
Copper, Tin,	nearly equal.
Platinum, Iron, Steel, Lead,	much inferior to the others.

(229.) It was ſtated (212.) that metals are the beſt conductors of any claſs of bodies with which we are acquainted. Next to them ſtones are the beſt conductors; though this property varies much in the different genera of ſtones. Thoſe which are moſtly compoſed of ſilex ſeem to be better conductors than thoſe which are chiefly compoſed of alumina: though the conducting properties of ſtones are not accurately aſcertained. Bricks, which are artificial ſtones, are the worſt conductors of any; eſpecially fire-bricks, which are chiefly compoſed of alumina. Hence, their uſe in the conſtruction of furnaces, and other ſtructures, whoſe object is to confine, and prevent the diſſipation of caloric. Hence alſo, brick houſes and thoſe lined with brick are warmer in winter than thoſe of ſtone, though the walls of the former ſhould be of inferior thickneſs.

(230.) Glaſs ſeems to poſſeſs nearly the ſame conducting power with ſome genera of ſtones. Hence, when one of its ſurfaces is expanded by the ſudden application of caloric, while the other remains contracted, it is apt to crack, or fly in pieces. The way to prevent this, is to plunge it wholly into hot water, or to expoſe both its ſurfaces alternately to the fire, that it may imbibe caloric and be expanded on both ſides, before any hot liquid be poured into it.

(231.) Next to theſe come dried woods, on whoſe conducting power Mr Meyer has made numerous experiments. Taking water to conduct as one, the reſult of his experiments is as follows.

Bodies.	*Conducting power.*
Water	1·00
Diaſpyrus ebenum	2·17
Pyrus malus	2·74
Fraxinus excelſior	3·08
Fagus ſylvatica	3·21
Carpinus betulus	3·23
Prunus domeſtica	3·25
Ulmus	3·25
Quercus robur pedunculata	3·26
Pyrus communis	3·32
Betula alba	3·41
Quercus robur ſeſſilis	3·63
Pinus picea	3·75
Betula alnus	3·84
Pinus ſylveſtris	3·86
Pinus abies	3·89
Tilea Europœa	3·90

(232.) Charcoal is a bad conductor, according to Morveau, its power being to that of fine ſand as 2 to 3. Hence it is often mixed in the outer coats of clay of which chemical furnaces are conſtructed. Plumbago, or graphite, which is chiefly compoſed of charcoal, is alſo a bad conductor. Hence its uſe in making what are called Auſtrian crucibles, and other utenſils which are expoſed to, or meant to confine, exceſſive heat. Feathers, ſilk, wool, and hair, are the worſt conductors of all the ſolid bodies with which we are acquainted. Count Rumford has aſcertained that their conducting power is inverſely as the fineneſs of their texture. Hence the uſe of theſe ſubſtances as articles of clothing, to confine the heat of the body, and prevent it from being carried off by the cold external air. Flaky ſnow is alſo a bad conductor, though, when conſolidated into ice, it conducts nearly as ſome kinds of ſtones, or better. Hence ſnow, in winter, ſerves the ſame purpoſe to the earth, that a thick fur does to an animal. It contains the heat of the earth, and prevents the cold from penetrating to the roots of plants, ſo as to extinguiſh all vegetation. In Siberia, the cold at the ſurface of the ſnow often congeals mercury; while at the ſurface of the earth it is 32°, and a little way below this, the earth is found to retain its medium temperature, varying from 44° to 54°.

(233.) The comparative conducting powers of liquids has not been accurately examined. But Dr Thomſon of Edinburgh aſcertained the relative conducting powers of water, mercury, and linſeed oil, as follows.

I. *Equal bulks.*

Water - -	1
Mercury - -	2
Linſeed oil - -	1·111

II. *Equal weights.*

Water - -	1
Mercury - -	4·8
Linſeed oil - -	1·085

(234.) It has been long known that gaſeous bodies were worſe conductors than fluids, or any other bodies with which we are acquainted; and hence, ſurrounding furnaces with a coat of air which is not allowed to ſhift, or change, is found moſt powerfully to prevent the waſte and diſſipation of the heat. It was alſo known, that heated bodies cool more ſlowly in ſtill air, than in water or other fluids. But bodies immerſed in the gaſes loſe their heat by radiation, by their carrying power, and by ſo many other means, that it is extremely difficult to aſcertain what degree of effect, in the proceſs of cooling, ſhould be aſcribed to the *conducting power* of theſe gaſes. Count Rumford aſcertained, that rarefying the air diminiſhed its conducting power; and that hot bodies cool ſloweſt in the Toricellian vacuum.

(235.) Mr Leſlie (Inquiry 476 &c.) has ſhewn that the conducting power of gaſes is diminiſhed by rarefaction. He calculates, from his experiments, that the conducting power of air is nearly in proportion to the fifth root of its denſity. Vapours and every thing which dilates air, diminiſh its conducting power.

(236.) The conducting powers of common air, oxygen and azote are nearly equal. Carbonic acid gas is a worſe conductor than common air. He has alſo rendered it probable that the conducting power of hydrogen gas is four times as great as that of air.

(237.) Having preſented an outline of what is known reſpecting the nature and motions of caloric, we come now to treat of what is called its EQUILIBRIUM, or the DISTRIBUTION of TEMPERATURE.

(238.) It is well known, that if a hot body be placed contiguous to colder bodies, it imparts to them its caloric, until they all exhibit the ſame temperature by the thermometer. In the ſame manner, if a colder body be ſurrounded by warmer bodies, they communicate part of their heat to the former, until the whole be brought to the ſame temperature. We have ſeen that caloric paſſes through ſolid bodies by their conducting power, which varies in different bodies, and which, however ſlow in its operation, ultimately brings the contiguous bodies to an equilibrium of temperature. When a hot body is immerſed in a fluid, its caloric is not only diſtributed by the conducting, but alſo by the carrying power; in conſequence of the inteſtine motion excited among its particles, which brings them all in ſucceſſion in contact with the heated body. And it has been ſeen that when a heated body is immerſed in a gaſeous body, the caloric is not only diſtributed by means of its carrying and conducting powers; but alſo by radiation. In conſequence of theſe various modes of diſtributing caloric, when a number of ſubſtances, of various temperatures, are mixed together, the caloric diffuſes itſelf equally among them all; and they all acquire the ſame temperature, which is the medium of their ſeveral temperatures before mixture.

(239.) Kraft and Richmann obſerved, that when a body is ſuſpended in air of a different temperature from itſelf, the difference between the temperature of the body and the medium diminiſhes in a geometrical ratio, while the time increaſes in an arithmetical ratio. Sir Iſaac Newton had made a ſimilar obſervation. That in given ſmall times the heat loſt is always proportional to the heat remaining in the body; and from this obſervation, he calculated ſeveral temperatures above the ſcale of thermometers.

(240.) Mr Leſlie has examined the proceſs of cooling, both in air and in water, with his uſual ſagacity; and the reſult of his obſervations may be ſtated as follows.

(241.) The effect of the conducting power depends upon the medium, and the temperature, and is conſtant while theſe are conſtant. When the medium remains the ſame, the effect diminiſhes as the temperature of the body approaches that of the medium.

(242.) The effect of radiation depends on the ſurface and temperature of the hot body; and is conſtant while theſe remain the ſame. But as the temperature of the hot body approaches that of the medium, the effect diminiſhes. It has been often obſerved, that this cauſe of cooling only operates when the hot body is immerſed in elaſtic media, and not when it is immerſed in liquids.

(243.) When caloric is *carried* from bodies by currents excited in the fluid or elaſtic media in which they are immerſed, the rate of cooling is in proportion to the difference between the temperature of the hot body, and that of the medium, and diminiſhes as the temperatures of the body and of the medium approach to equality.

(244.) If the currents which carry caloric from bodies be artificially increaſed, the rate of cooling will be proportionably increaſed. Hence bodies cool more rapidly when expoſed to the wind than to ſtill air. The original temperature of bodies being the ſame, their rate of cooling will always be proportioned to the velocity of the wind, or to the velocity with which the body is moved through the air. Thus Mr Leſlie found that a hot ball which, in calm air, cooled down a certain number of degrees in 120 minutes, when moved with different velocities through the ſame air, loſt the ſame quantity of heat in times diminiſhing as the velocities increaſed.—Thus,

Velocity.		*Time of cooling.*
6⅓ feet per ſecond	- -	60 minutes
20	- - - -	30
60	- - - -	12

Allowance being made for the rate of cooling when the body and its medium are at reſt, its increaſe by motion is found to be in exact proportion to the velocity either of the body againſt the medium, or of the medium againſt the body, reſpectively.

(245.) Many hypotheſes have been formed to account for the tendency of caloric to diſtribute itſelf equally through all bodies. De Marian and others ſuppoſed caloric to pervade all ſpace, and that all bodies are penetrated by it, as a ſponge with water, without having any attraction for it. Hence if caloric be accumulated in a body, it muſt flow out; or if it be diminiſhed, it muſt flow in, until the equilibrium be reſtored. But were this hypotheſis true, all bodies ought to heat and cool with equal facility; and many of the facts already adduced are utterly inconſiſtent with the ſuppoſition.

(246.) Mr Pictet endeavoured to account for the phenomenon by the elaſticity, or repulſion among the particles of caloric. He ſuppoſed that when caloric was accumulated in a body, its particles being brought cloſer together, had their elaſticity, or tendency to fly off increaſed. That this repulſion cauſed them to dart around, and enter other bodies, unleſs they were met by bodies of equal or greater temperature, where their entrance was repelled by an equal or greater elaſticity.

(247.) The opinion now generally received is that which was advanced by Prevoſt in the *Journal de Phyſique*, 1791, and afterwards more fully illuſtrated in his *Recherches ſur la Chaleur*. He ſuppoſes caloric to be a peculiar fluid whoſe particles, when at liberty, move with immenſe velocity, without touching each other. That all hot bodies emit calorific rays in every direction, which meet and croſs each other, without interference, like the rays of light. Hence if we ſuppoſe two neighbouring bodies in which caloric abounds, there will be a conſtant interchange of caloric betwixt them. But the only interchange that will be ſenſible to us, will be the degree in which the one body exceeds the other. Thus if the quantity of caloric in the one body be as 20, and that in the other as 10, the interchange of the overplus, or 10 will only appear to us, which being divided between each of the bodies, will leave both with a quantity as 15.

(248.) But this theory ſeems to aſſume no other mode of diſtributing caloric except by radiation; and were it well founded, all bodies ſhould ſpeedily be reduced to the ſame temperature; which we know is not the caſe. We know that caloric is *conducted* through bodies, very ſlowly, and *carried* more rapidly through fluids and gaſes, as well as *radiated* through the latter. The circumſtance of the rate of cooling being in a geometric progreſſion, while the times are in arithmetic progreſſion, ſeems to indicate elaſticity, or a repulſive force among the particles of caloric, which, the more they are condenſed in a body, will carry them from it with the greater velocity. We ſhould hence infer that though radiated caloric be always too rapid to admit of being meaſured at ſhort diſtances, yet its rapidity may vary according to its intenſity in the body from which it is emitted: that is, its velocity may perpetually diminiſh, as the elaſtic force which impels it is diminiſhed.

(249.) As far as our obſervation extends, radiation has a very limited influence in diſtributing caloric over our globe, compared with the conducting and carrying-powers of ſubſtances. The conducting power, though ſlow, is conſtant in its operation. As the rays of the ſun excite moſt heat where they fall perpendicular to the earth's ſurface, ſo the tropical regions, at the ſame elevation, are warmer than thoſe ſituated towards the South and North of the tropical circles. The effect of this is, that the ocean, under the Equator, being warmed, becomes ſpecifically lighter than the waters towards either pole; much of which are formed, during ſummer, from melted ice and ſnow. This produces a warm current at the ſurface during ſummer, in each hemiſphere, towards the poles; and a cold current below from the poles towards the equator. When either hemiſphere is warmed, during ſummer, the currents ceaſe, or are reverſed. Hence we often find betel nuts, leaves and fragments of ſugar canes, of bamboo canes, mahogany, and various other vegetable productions of the torrid zone, within tide mark, on the weſt of Lewis, and other Hebridean iſles, mixed with pumice ſtone from Hecla in Iceland.

(250.) The burning ſands of Africa, of Arabia, &c. imbibe a very high temperature, which they communicate to the air in contact with them. Thus the air becomes ſpecifically lighter, and mounting upwards, produces a current from either pole to be heated and buoyed upwards in ſucceſſion. Hence, in ſpring, we can ſee by the motion of the clouds, a current in the higher parts of the atmoſphere towards the north-eaſt, and one below towards the ſouth-weſt. The currents in fact move from the north, and from the ſouth; but the motion of the earth from weſt to eaſt, makes them appear to move from north-eaſt, and ſouth-weſt. After the ſun has heated the northern hemiſphere, theſe currents are reverſed, the lower being from SW. and the higher from NE. the firſt conſiſting of colder air from the wintery ſouthern hemiſphere; the ſecond of warmer air from the ſummer's heat of the northern hemiſphere. It is unneceſſary to enter into a detail of all the cauſes which occaſion variations in the direction of currents, both in the ocean, and in the atmoſphere. It is ſufficient to hint at their ſource, or ſpring; and it muſt be evident that theſe currents, in their progreſs, muſt perpetually interchange their temperatures, both by the conducting power of ſubſtances, and by the carrying powers of water and air. Hence they ſerve to keep up the equilibrium of caloric much more effectually than could be done by radiation. Hence alſo the burning ſands of Africa, of Arabia, &c. though uninhabitable themſelves, perpetually operate in melting, and in preventing the extenſion of eternal ſnow and ice towards either pole: and thus contribute to render a large portion of each hemiſphere a ſalutary habitation for man.

(251.) We hazarded an opinion that light might be only matter of extreme minuteneſs and velocity, adapted to excite ſenſations in the moſt delicate of our organs, the optic nerve. Caloric ſeems to be a groſſer kind of matter, which affects the whole nervous ſyſtem.

(252.) Having diſcuſſed the nature, motions, and diſtribution, we now come to conſider

The Effects of Caloric.

I. Expansion.

(253.) *When caloric enters a body, it is enlarged in bulk, and when it leaves a body, its bulk is diminiſhed.* This may be ſtated as an univerſal rule, to which the exceptions are very few, and theſe ſhall be conſidered afterwards. *Expanſion* may therefore be conſidered as one of the moſt general effects of heat, and it is the more important as it furniſhes the means of meaſuring all its other known effects.

(254.) Though all bodies be expanded by heat, and in the ſame body the degree of enlargement bears a relative proportion to the quantities of caloric added or abſtracted, yet all bodies are not equally expanded by the ſame quantities of caloric. The expanſion of gaſeous bodies is greateſt of all; that of liquids much ſmaller; and that of ſolids is leaſt. Thus 100 cubic inches of atmoſpheric air, at 32°, when heated to 212°, are expanded to 137·5 cubic inches; while 100 cubic inches of water, heated to the ſame point expand only to 104·5 cubic inches, and 100 cubic inches of iron ſcarcely exceed 100·1 cubic inches. Hence the expanſion of air is more than eight times greater than that of water, while that of water is about 45 times greater than that of iron, with the ſame increaſe of temperature.

(255.) The experiments of De luc, General Roy, Sauſſure, Divernois, &c. on the expanſion of gaſes, ſeem to have varied in their reſults, from their admitting water to mix with the gaſes on which they operated; which being raiſed in vapour by the heat applied, rendered their concluſions uncertain. Fortunately Mr Dalton of Mancheſter adopted the precaution of drying his gaſes completely; and the gas to be examined being introduced into a glaſs tube, open at one end, and divided into equal parts, mercury was introduced into the open end of the tube. Heat being applied to the gas, the amount of its expanſion was meaſured by the diſtance to which it puſhed the mercury on the meaſured tube. Mr Gay Luſſac, with a more complicated apparatus, but which admitted larger volumes of air, arrived at nearly the ſame reſults with Mr Dalton, and their coincidence adds much to the confidence which may be placed in their concluſions.

(256.) From the experiments of theſe philoſophers, it appears that all gaſeous bodies undergo the *same* expanſion, by the ſame addition of heat, ſuppoſing them placed in the ſame circumſtances. If therefore the expanſion of one of the gaſes be aſcertained, the expanſion of all of them is known. It alſo appears that equal additions of heat produce equal expanſions in the gaſes, at all periods from the loweſt to the higheſt temperature. The only exception to this was that the expanſion from 55° to 133½°, or for the firſt 77½ degrees, was 167 parts; while the expanſion from 133° to 212°, or for the next 77½ degrees was only 158 parts; or nine parts leſs than the firſt. But De Luc has demonſtrated that the thermometer is not an accurate meaſure of the increaſe of heat; and it is very probable that this irregularity is rather apparent than real; as may appear more fully afterwards, when we come to treat of the thermometer.

(257.) The equable expanſion of the gaſes with equal additions of caloric, points them out as fit ſubjects on which our philoſophers ſhould exert their ingenuity, with a view to conſtruct thermometers not only of great ſenſibility, but accuracy. As theſe bodies are not known to change their ſtate either in very low, or in very high temperatures; it is probable an apparatus might be contrived which would enable them to meaſure degrees of cold below the freezing of mercury, and ſuch high temperatures as were meaſured by Wedgewood's thermometer.

(258.) Mr Gay Luſſac aſcertained that the ſteam of water, and of ether, expand to the ſame bulks with air, when the ſame additions are made to their temperature. It may therefore be concluded that all elaſtic fluids expand equably by equal additions of heat; and that their contractions are equable with equal abſtractions of caloric. The ſlight variation noticed, (256.) ſeems not to militate againſt the general rule.

(259.) Taking the bulk of air at 32° to be 100000, the following Table exhibits its increaſe of volume at all temperatures, up to 212°, or the boiling point of water: and from this it may be eaſily calculated to any higher temperature.

Temp.	Bulk.	Temp.	Bulk.	Temp.	Bulk.
32°	100000	59°	105616	86°	111232
33	100208	60	105824	87	111440
34	100416	61	106032	88	111648
35	100624	62	106240	89	111856
36	100832	63	106448	90	112064
37	101040	64	106656	91	112272
38	101248	65	106864	92	112480
39	101456	66	107072	93	112688
40	101664	67	107280	94	112896
41	101872	68	107488	95	113104
42	102080	69	107696	96	113312
43	102288	70	107904	97	113520
44	102496	71	108112	98	113728
45	102704	72	108320	99	113936
46	102912	73	108528	100	114144
47	103120	74	108736	110	116224
48	103328	75	108944	120	118304
49	103536	76	109152	130	120384
50	103744	77	109360	140	122464
51	103952	78	109568	150	124544
52	104160	79	109776	160	126624
53	104368	80	109984	170	128704
54	104576	81	110192	180	130784
55	104784	82	110400	190	132864
56	104992	83	110608	200	134944
57	105200	84	110816	210	137024
58	105408	85	111024	212	137440

(260.) Liquids are far from being ſo equable in their expanſion as gaſeous bodies; and hence their expanſion is not ſo accurate a meaſure of the degrees of heat as that of gaſes. The liquids which boil at the loweſt temperatures expand more by the application of the ſame degree of caloric, than the liquids which are more fixed; and the expanſion of the former is alſo more irregular than that of the latter. Thoſe alſo which contain an ingredient which is apt to aſſume the gaſeous form, are very irregular in their expanſion. All liquids when they approach their boiling, or vapourific temperature, become irregular in their expanſion; the ſame may alſo be obſerved of thoſe which approach the point of congelation.

(261.) Thus alcohol is much more expanded by the ſame degree of heat than water, becauſe its boiling temperature is lower. For the ſame reaſon water is more expanded than mercury. Nitric acid is much more expanded than ſulphuric acid, not only becauſe its boiling point is lower, but becauſe a portion of it is apt to aſſume the gaſeous form. Hence the expanſibility of liquids may, in general, be ſtated to be nearly inverſely as their boiling or gaſeous temperature. But the expanſibility of liquids alſo increaſes with their temperature, and when they approach boiling, they are much more expanded by equal additions of caloric, than when they were at a lower temperature. Hence thoſe liquids, ſuch as mercury, expand moſt equably whoſe boiling points are higheſt.

(262.) The following Table exhibits the comparative expanſion of various liquids, at different temperatures from 32° to 212°.

Temp.	Mercury.	Linſeed oil.	Sulphuric acid.	Nitric acid.	Water.	Oil of Turpentine.	Alcohol.
32°	100000	100000	——	——	——	——	100000
40	100081	——	99752	99514	——	——	100539
50	100183	——	100000	100000	100023	100000	101105
60	100304	——	100279	100486	100091	100460	101688
70	100406	——	100558	100990	100197	100993	102281
80	100508	——	100806	101530	100332	101471	102890
90	100610	——	101054	102088	100694	101931	103517
100	100712	102760	101317	102620	100908	102446	104162
110	100813	——	101540	103196	——	102943	——
120	100915	——	101834	103776	101404	103421	——
130	101017	——	102097	104352	——	103954	——
140	101119	——	102320	105132	——	104578	——
150	101220	——	102614	——	102017	——	——
160	101322	——	102893	——	——	——	——
170	101424	——	103116	——	——	——	——
180	101526	——	103339	——	——	——	——
190	101628	——	103587	——	103617	——	——
200	101730	——	103911	——	——	——	——
212	101835	107250	——	——	104577	——	——

(263.) That all bodies, and eſpecially metals, are expanded by caloric, and contracted by its removal, is known to every one. When a heated ring of iron is put round a cart wheel, though it ſhould be looſe when put on; being cooled by throwing water upon it, it contracts and compreſſes the wheel with great force. A cylinder of iron which paſſes through a hole in a bar of iron, when cold, will not paſs through the ſame hole when heated red hot. Thus heat expands metals laterally, or increaſes their breadth. The ſame cylinder which exactly fits a notch in the ſame bar, or guage, when cold, will not go into it when red hot; ſhewing that heat expands metals longitudinally as well as laterally, or enlarges them in all their dimenſions.

(264.) The expanſion of metals, by the ſame temperature, is not nearly ſo great as that of liquids; as the expanſion of liquids is much inferior to that of gaſes. But as far as is known, equal additions of temperature cauſe equal expanſions in metals; at leaſt until they approach the temperature of fuſion, or of vapour.

(265.) The following Table exhibits the expanſion of metals, as aſcertained by Mr Smeaton.

Temp.	Platinum.	Gold.	Antimony.	Steel.	Iron.
32°	100000	100000	100000	100000	100000
212	100087	100094	100109	100112	100126

Temp.	Caſt Iron.	Biſmuth.	Silver.	Copper.	Caſt Braſs.
32°	100000	100000	100000	100000	100000
212	100111	100139	100189	100170	100188

Temp.	Braſs Wire.	Tin.	Lead.	Zinc.	Hammered Zinc.
32°	100000	100000	100000	100000	100000
212	100194	100238	100287	100296	100308

Temp.	Zinc 8. Tin 1.	Lead 2. Tin 1.	Braſs 2. Zinc 1.	Pewter.	Copper 8. Tin 1.
32°	100000	100000	100000	100000	100000
212	100259	100251	100205	100228	100182

266.) Glaſs being uſed in the conſtruction of thermometers, its expanſion is of great importance to be known; and it has been accurately inveſtigated by De Luc, as follows:—

Temp.	Bulk.	Temp.	Bulk.	Temp.	Bulk.
32°	100000	100°	100023	167°	100056
50	100006	120	100033	190	100069
70	100014	150	100044	212	100083

Hence it appears that one degree of heat expands glaſs to $\frac{1}{100000}$th part of its whole bulk. The glaſs examined by De Luc was what is commonly uſed for making thermometer and barometer tubes. But Ramſden and Smeaton have ſhewn that glaſs varies in expanſion according as it is ſolid or tubulated, and according to its component ingredients.

(267.) The expanſion of bodies by the addition of caloric, and their contraction upon its removal from them, afford the means, as already hinted, not only of meaſuring the intenſity, but of inveſtigating moſt of the other phenomena of caloric. The inſtrument uſed for this purpoſe is called a

Thermometer.

(268.) It commonly conſiſts of a glaſs tube, of equal diameter throughout; on one end of which is blown a globular, or conical bulb. The bulb is filled by heating and rarifying the air in it, and then plunging the open end of the tube in pure diſtilled mercury. The open end of the tube is then hermetically ſealed by a blow-pipe. When the mercury in the bulb receives an addition of caloric, it expands and riſes along the tube; and when the caloric is withdrawn, it ſhrinks. For the convenience of meaſurement, to the tube is annexed a ſcale, divided into equal parts, each of which is called a *degree* of temperature, or warmth; and the riſe or fall of the mercurial wire in the tube, points out the degrees of temperature on the ſcale.

(269.) The firſt thermometer is ſaid to have been invented, about the beginning of the 17th century, by Sanctorio, a celebrated phyſician. It was improved by the Florentine academicians, and by Mr Boyle. But Sir Iſaac Newton firſt pointed out the way of making thermometers that agreed with each other.

(270.) He obſerved that a mixture of ice or ſnow, with water, was always of the ſame temperature; and that water, under the ſame denſity of the atmoſphere, always boiled at the ſame temperature. Taking therefore the freezing point of water from a mixture of ice or ſnow with water, and its boiling point when the barometer was of medium altitude, he thus fixed two points in the the thermometrical ſcale, viz. the *freezing* and *boiling* of water. The freezing point he marked 0, and divided the interval between that and boiling into 100 equal parts; which might be continued upwards or downwards *ad libitum*.—This is the moſt rational thermometrical ſcale yet invented: and though it was ſupplanted by others, about to be deſcribed, it has lately been revived by the French under the name of the *thermometre centigrade*.—But the French do not ſeem to have ſufficient candour to acknowledge the ſource from whence they derived the improvement.

(271.) The thermometer that has been chiefly uſed in Britain, is that which was invented by Mr Fahrenheit of Amſterdam. Having diſcovered a cooling mixture of ſnow and common ſalt, he erroneouſly imagined he had ſucceeded in extracting all the caloric from bodies. Hence he marked the point of the ſcale at which his thermometer ſtood when put into this mixture 0, *Zero*, or total abſence of heat. From this point he divided the ſcale upwards, ſo that the freezing of water fell at 32°, and the point at which it boils at 212°.

(272.) Celſius conſtructed his thermometer upon the ſame principle with Sir Iſaac Newton; and it has always been uſed in Sweden, and other northern countries. We ſtated that it has been lately adopted by the French; and from its ſimplicity and facility of calculation, is likely to become general.

(273.) The thermometer hitherto uſed in France, and ſtill uſed in Italy and Spain, is that which is known by the name of Reaumur, but was conſtructed by De Luc. It only differs from the *centigrade* thermometer in having the ſpace between the freezing and boiling of water divided into 80° inſtead of 100 degrees. In both, the freezing point is marked 0; but in this the boiling point is marked 80°.

(274.) The thermometer uſed in Ruſſia is that which was conſtructed by De Liſle. In it the boiling point of water is marked 0; and its freezing point is marked 150°: ſo that in this the order of calculation is the reverſe of what it is in the others.

(275.) The conſtructors of thermometers ſeem to have been led into theſe variations in their mode of conſtructing them, from erroneous theories concerning the point of abſolute cold, or the total abſence of heat; and from erroneous calculations, founded on their theories, of the quantity of heat neceſſary to produce a given expanſion in mercury and other fluids.

(276.) Many attempts have been made to conſtruct thermometers by the expanſion of bars of metal. But as the expanſion of ſolids is very ſmall, any error in the conſtruction of the inſtrument, occaſions very great deviations in the reſult. Mr Crichton of Glaſgow conſtructed thermometers of this ſort, for meaſuring the temperature of the atmoſphere. They conſiſted of a great number of bars of iron or ſteel, combined together on the principle of the compound lever. The laſt bar conveyed its own expanſion, with the accumulated expanſion of all the other bars, and that too multiplied by the power of the compound lever, to a wheel and pinion, on which an index was fixed, which pointed the degrees of heat on a circular plate, like the dial of a clock. This idea has lately been improved upon in France, and ſuch thermometers are included in a ſilver caſe, every way reſembling a common watch. But they do not ſeem ſuſceptible of a greater range of ſcale than 100°, viz. from the freezing to the boiling of water.

(279.) It was ſhewn, Table (362), that the expanſion of mercury is not equable through all its range;

renge: that is, equal additions of heat do not produce equal expanſions, at all points from the congealing to the boiling point of mercury; but that the more this metal approaches to its boiling point, the greater are the expanſions produced by equal additions of caloric. From this it happens that the medium temperature between 32° and 212°, the freezing and boiling points of water, is not in reality 122°, but 118·8°. This ſource of error might be diminiſhed, or rather it might be ſpread over a greater extent of ſcale, were the points of calculation taken from ſome ſubſtance which congeals at a lower temperature than water, and which requires a much higher temperature to make it boil. Taking diſtant points from which to calculate, would alſo bring the expanſions and contractions of the glaſs, which are equable, to harmonize with thoſe of the included fluid, which vary from reaſons aſſigned. But what is ſtated may ſerve to illuſtrate the propriety of what was hinted at, (256,) of having recourſe to the expanſion of gaſeous bodies as exact meaſures of caloric, which, as far as we know, is perfectly equable at all temperatures.

(280.) Having thus conſidered the phenomena of expanſion, and the uſes to which this property of bodies is applied, we come now to conſider the exceptions to the general law, of the expanſion of bodies by caloric.

(281.) Water is known to be at its *maximum* of denſity, when its temperature is nearly 40°. If it be heated above this point, it continues to expand, in an accelerating ratio, until it reaches 212°, or its boiling point. If it be cooled below 40°, it alſo continues to expand, or increaſe in bulk, until it reaches 32°, or its freezing point; or even lower.—Here then the addition of caloric produces the ſame effect upon the ſame body, that is produced by its abſtraction; that is, both expand, or enlarge its ſize.

(282.) It has been long known to every one, that ice, or ſolid water, floats on that which continues fluid; and hence a concluſion was drawn, that ſolid water is of leſs ſpecific gravity than that which continues fluid. But the expanſion of water when it approaches to the freezing point, was firſt accurately obſerved by the Florentine academicians, 1670. They had filled with water a large glaſs ball, terminating in a narrow graduated neck; and having plunged it in a mixture of ſnow and ſalt, obſerved that it contracted until its temperature ſunk to a certain point, beyond which the water began to riſe again in the neck. When ſome of it was converted into ice, it roſe very ſuddenly. This induced Dr Croune to repeat their experiments in 1683, which led him to conclude that water below a certain temperature was expanded by cold, as, above this temperature, it is expanded by heat. To this it was objected, that the apparent expanſion of the water was occaſioned by the contraction of the glaſs. But when the glaſs was previouſly cooled in a mixture of ſnow and ice, no variation in the effect was obſerved. Mr De Luc placed the temperature at which water begins to expand at 41°, and eſtimated its expanſion to be equal at all equal temperatures above and below 41°. Sir Charles Blagden, and Mr Gilpin fixed the maximum denſity of water at 39°; and reckoned its increaſe of bulk to be equal, at the ſame number of degrees above and below 39°. Mr Dalton in 1802 obtained nearly the ſame reſults with De Luc; without making any allowance for the contraction of the glaſs. He fixed the maximum denſity at 42·5°; and obſerved that the ſame number of degrees below this point, produced the ſame expanſions as thoſe above it, until the water began to freeze.

(283.) When the French were intent on their new ſtandard of weights and meaſures, having aſſumed water as their ſtandard of weight, it was neceſſary to aſcertain its denſity at all temperatures. This was done by Lefebvre-Gineau, by means of a cylinder of copper, nine French inches long, and as many in diameter; which being weighed in water of various temperatures, with proper allowances for the variations in the bulk of the cylinder itſelf by heat or cold, exhibited the preciſe weight or denſity of a quantity of water equal in bulk to the cylinder, at all temperatures. The reſult was, that water is of higheſt denſity at 40°, and that it expands equally, by equal degrees, above and below 40°. Haellſtroem tried the ſame experiment with a cylinder of glaſs; and the reſult was nearly the ſame. He found the maximum denſity of water to be from 4° to 5° of Celſius; or about 40° of Fahrenheit.

(284.) Dr Hope, by uſing tall glaſs veſſels filled with water of different temperatures, and having thermometers at top, middle, and bottom, aſcertained that when water was cooled down to 40° at the ſurface, it ſunk to the bottom; and when cooled again below 40° at the bottom, it roſe again to the ſurface. Count Rumford has made ſimilar experiments to thoſe of Dr Hope, and their united reſult is to fix the greateſt denſity of water between 39° and 40°.

(285. Much mathematical reaſoning, and laborious calculation, have been thrown away, with a view to prove that the phenomena now deſcribed are owing to the contraction of the veſſels in which the water is contained. Solids are ſuppoſed to expand equally at equal temperatures; but water, and other liquids, expand nearly in the duplicate ratio, or as the ſquares of their temperatures. Hence below 40°, water may appear to expand, although it ſhould be actually diminiſhing in bulk; becauſe the veſſel which contains it, contracts at this and lower temperatures much more rapidly than the water expands. But the experiment of Lefebvre, in aſcertaining the ſpecific gravity of water at different temperatures, could neither be affected by the contraction or expanſion of the veſſels in which it was contained: and we muſt look towards other cauſes to account for the phenomenon.

(286.) It is well known that ſeveral bodies expand into a larger volume when they begin to aſſume the ſolid form; that is, when the caloric is withdrawn from them which occaſioned their fuſion. This is the caſe with caſt iron, biſmuth, antimony, and ſeveral metallic mixtures. Hence in melting ſuch metals and mixtures, the ſolid part always floats on the ſurface of the part already fuſed, as was ſtated with regard to ice. This has alſo been ſhewn to be the caſe with regard to mercury, by Mr Cavendiſh, Mr Macnab, and others, and hence ſuch various opinions concerning the freezing temperature of mercury. When this metal approaches ſolidification, like water, it rapidly expands: and after freezing contracts by additional cold, like any other ſolid. Sulphur, ſulphate of lime or gypſum, a great number of the ſalts, glaſs, and many other bodies, poſſeſs the property of expanding when they approach, or aſſume the ſolid form. Though there are many bodies which diminiſh in bulk when they become ſolid, all thoſe increaſe in ſize, which affect a particular arrangement of their particles, to which we give the name of cryſtallization.

(287.) That this is the caſe with ice is well known. Dr Thomſon aſcertained the ſpecific gravity of ice to be to that of water, of the ſame temperature, as 92 is to 100. When water conſolidates, it not only cryſtallizes, but ſuddenly expands with a force greater than any force that has been yet oppoſed to it. Solid rocks have been ſplit aſunder, and maſſy towers have been raiſed from their baſis, by the expanſive power of ice. Every one knows that bottles are burſt in pieces by water frozen in them; and the Florentine academicians burſt a braſs globe of great thickneſs, by freezing water within it.

(288.) The expanſion of water at temperatures below 40° is therefore probably owing to its particles beginning to aſſume that particular arrangement, which is completed by its cryſtallization, or conſolidation into ice.

(289.) Caloric not only expands; but, in certain circumſtances, produces a

II. Change *in the* state *of* Bodies.

(290.) A great variety of ſolid bodies, when expoſed to a particular temperature, become liquid; and moſt liquid bodies, at a higher temperature become elaſtic vapour, or gaſes. Thus ice when heated to 32° becomes water, and water when heated to 212° becomes ſteam. There are a few ſolid bodies which do not melt at any temperature we can produce; and the gaſes do not become liquid, or ſolid bodies, unleſs they enter into chemical combination, at the loweſt temperatures of our atmoſphere. But philoſophers have inferred a general rule from the facts that are known,—That all ſolid bodies would become liquid, and all liquids elaſtic vapours, were they expoſed to a ſufficient degree of heat: and that all gaſeous bodies, even our atmoſphere itſelf, would become firſt liquid, and then ſolid, were they ſubjected to a ſufficient degree of cold.

(291.) Some bodies, ſuch as water, &c. paſs at once from a ſtate of perfect fluidity to ſolidity, and *vice verſa*. But other bodies, ſuch as glaſs, wax, tallow, &c. paſs through many intermediate degrees of ſoftneſs before they become either perfectly fluid or ſolid. In general thoſe bodies which cryſtallize, or arrange their parts into regular figures, paſs at once from ſolidity to fluidity.

(292.) Solid bodies do not become fluid unleſs they be heated to a certain temperature; and the liquifying temperature of the ſame body, is always the ſame. It is not eaſy to aſcertain the fluid temperature of thoſe bodies which paſs through many ſhades of ſoftneſs before they acquire perfect fluidity. But the ſame temperature always produces the ſame degree of ſoftneſs in the ſame body. When bodies, ſuch as water, which are uſually liquid, become ſolid, they are ſaid to *freeze*, or *congeal*; and when this happens, their temperature is ſaid to be their *freezing* or *congealing point*. But when a body is uſually ſolid, its liquifying temperature is called its *melting point*. Thus 214° is the melting point of ſulphur, and 442° is the melting point of tin.

(293.) The following Table exhibits the melting point of ſeveral ſolid bodies.

Substance.	*Melting point.*	*Substance.*	*Melting point.*
Lead - -	594°	Ice - -	32°
Biſmuth -	576	Milk - -	30
Tin - -	442	Vinegar - -	28
Sulphur - -	214	Blood - -	25
Wax - -	142	Oil of Bergamot	23
Bleached do. -	155	Wine - -	20
Spermaceti -	112	Oil of turpentine	14
Phoſphorus -	100	Mercury below 0	–39
Tallow - -	92	Liquid ammonia	46
Oil of aniſe -	50	Ether - -	46
Olive oil -	36		

(294.) Pure water, that has had the air expelled from it by boiling, if ſlowly cooled in a freezing mixture, and without agitation, may be cooled below 32° without freezing. Blagden ſucceeded in cooling it to 22°, or 10 degrees below its freezing point. If a piece of ice be thrown into it, or if it be ſhaken, it ſuddenly ſhoots into cryſtals, and its temperature riſes to 32°. We had formerly occaſion to mention this as an example of increaſe of temperature by the ſudden conſolidation of bodies.

(295.) Water, which contains ſalts in ſolution, requires a lower temperature to make it freeze than water which contains no ſalt. Hence the ſea, in our climate, is always liquid, while freſh water is often frozen. When ſalt water freezes, it depoſits the ſalt it held in ſolution, and the ice, when melted, yields freſh water. Hence Captain Cook, and other navigators, ſupplied themſelves with water from floating ice in the polar regions.

(296.) The following Table, by Sir Charles Blagden, exhibits the freezing points of 100 parts of water, with various proportions of different ſalts diſſolved in it.

Names of Salts.	Proportion in 100 of water.	Freezing point.
Common ſalt - - -	25	4°
Sal ammoniac - - -	20	8
Rochelle ſalt - - -	50	21
Sulphate of magneſia	41·6	25·5
Nitre - - - - -	12·5	26
Sulphate of iron - -	41·6	28
Sulphate of zinc - -	33·3	28·6

Hence it appears that common ſalt is the moſt efficacious of any in lowering the freezing temperature of water. But an additional quantity of this ſalt lowers the freezing temperature ſtill more.

Thus if $\frac{1}{10}$th of common ſalt lower the freezing point 10 degrees, $\frac{2}{10}$ths will lower it 20°, and ſo of other proportions.

(297.) Acids, ſuch as the ſulphuric and nitric, which are compounds containing various proportions of water, when diluted to a certain degree, and expoſed to cold, divide into two bodies, viz. a weaker acid which freezes, and a ſtronger acid which remains liquid. Here it is the water which freezes, and includes a portion of the acid. When theſe acids are very much diluted, the whole maſs freezes; and the congealing point of water is lowered in a greater ratio than the increaſe of the acid. When theſe acids are concentrated to a certain point, they wholly congeal with a ſufficient degree of cold; but if their ſtrength be greater or leſs than this point, the cold muſt be increaſed.

(298.) The following Table exhibits the freezing points of ſulphuric acid, of various ſtrengths.

Strength.	Freezing point.
977	+1°
918	—26
846	+42
758	—45

Hence the ſtrength of 758 is eaſieſt freezed, and that of 977 moſt difficult. But if the ſtrength be increaſed beyond 977, its freezing is effected with ſmaller degrees of cold.

(299.) It was formerly imagined that after a body arrived at its liquifying temperature, a very ſmall addition of heat converted it into a fluid. But the late ſagacious Dr Black, earlier than 1762, obſerved, and taught at Glaſgow, that when a body began to liquify, much heat entered into its compoſition, which became *latent*, or did not affect the thermometer. Thus if a piece of ice, whoſe temperature is 22°, be brought into a warm room, whoſe temperature we may ſuppoſe 55° or 60°, the ice will ſoon riſe to the temperature of 32°, its freezing point. It will then begin to melt, but it will continue ſeveral hours at 32°, and will not riſe above this point until after the whole is melted into water. There can be no doubt but that, all the while, caloric is going into the ice, though it does not raiſe its temperature. This caloric muſt therefore enter into chemical union with the ice, and convert it into water. Hence water is a compound of ice and caloric; and this concluſion comprehends all ſolid bodies which are melted by heat.

(300.) In a room whoſe temperature was 47°, Dr Black ſuſpended a glaſs globe filled with water which was cooled down to 33°. In half an hour a thermometer placed in this water roſe to 40°, or ſeven degrees. At the ſame time, there was ſuſpended in the ſame room another glaſs globe, filled with water, which was frozen into ſolid ice. The water in this globe only roſe to 40° after ten hours and a half, when the whole was melted, except a ſpongy ſubſtance at the ſurface, which ſoon diſappeared. Thus the ice required ten hours more than the cold water, to liquify, and riſe to the temperature of 40°. The melting ice muſt therefore have imbibed 139 or 140 degrees of heat which became latent, and did not affect the thermometer.

(301.) That heat is actually combined in melted ice, or water, appears from this fact, that the ſame heat is evolved, or thrown out while the water is again converting into ice.

(302.) *First.* If we ſubject a quantity of brine which only freezes at 0, and a quantity of water, to a freezing mixture, the water will only cool down to 32°, when it begins to congeal while the brine, or ſaline ſolution, will cool down to its freezing point before its temperature becomes ſtationary. Here both bodies are equally ſubject to the abſtraction of caloric; but the water, during freezing, remains ſtationary in conſequence of caloric evolved from its ſubſtance, which counteracts the effect of its abjection by the freezing mixture. That heat is evolved from the water during this proceſs, may be obſerved by means of a delicate thermometer, ſuſpended above it, which will be affected by heat carried upwards by currents of air.

(303.) *Second.* The example quoted (294) where water is cooled to 22°, and being ſhaken, freezes, and riſes at once to 32°, or 10 degrees, is a clear proof that heat is evolved by the congelation of water.—All bodies that paſs ſuddenly from a liquid to a ſolid ſtate, give out heat; and when they paſs ſlowly, they doubtleſs give out the ſame proportion of heat, though it may not be obvious to our ſenſes.

(304.) The ingenious Dr Thomſon, in repeating theſe experiments, has obſerved, that when the water is cooled down to 22°, nearly $\frac{1}{14}$th of the whole freezes; and when it is cooled to 27°, about $\frac{1}{28}$th of the whole freezes. He concludes that for every 5 degrees of temperature below the freezing point, $\frac{1}{28}$th part of the water ſuddenly freezes on being agitated. Therefore if the water could be cooled five times 28°, or 140 degrees below the freezing point, without freezing, the whole would ſuddenly congeal on being ſhaken; and its temperature would, at the ſame time, riſe to 32°. This accounts for the 140 degrees of heat which Dr Black (300) found to be abſorbed, or to become quieſcent in water while it melts, and which is again given out when it freezes.

(305.) *Third.* Dr Black mixed 119 half-drachms of ice at 32° with 133 of water at the temperature of 190°; or allowing for the heat of the glaſs veſſel, 143 half-drachms of water at this temperature. The ice was ſpeedily melted; and had the heat been equally divided, the temperature after mixture ſhould have been 104°. But the temperature was only 53°; that is, the hot water loſt 137°, while the ice received an addition of temperature only equal to 21°. Hence 140° of heat muſt have diſappeared altogether from the hot water, and muſt have entered into compoſition with the ice, and converted it into liquid. If we take a quantity of ice or ſnow at 32°, and pour water upon it at 172°, part of the ſnow melts, but the temperature of the mixture continues to be 32°. Here 140° degrees of heat become dormant, or enter into compoſition with that part of the ſnow which is liquified.

(306.) It follows therefore that when water is cooled down to 32°, it cannot freeze until it has parted with 140° of caloric; and when ice is warmed to 32°, it cannot melt until it has abſorbed 140° of caloric. This is the reaſon why melting and freezing are ſuch ſlow proceſſes, as they cannot advance except in proportion as the caloric can be abſorbed and emitted.

(308.) Dr Black alſo aſcertained that the fluidity of melted wax, tallow, ſpermaceti, metals, and other bodies, is owing to the ſame cauſe, that is, the abſorption of caloric, which enters into the compoſition of the fluid body. Hence a general concluſion, That fluids are ſolid bodies diſſolved, or rendered fluid, in conſequence of combination with caloric. To the caloric which entered into the compoſition of a fluid, Dr Black gave the name of *latent heat*, becauſe it does not affect the thermometer. But other philoſophers have rather choſen to call it the *caloric of fluidity*.

(308.) The late Dr Irvine, Profeſſor of Chemiſtry at Glaſgow, aſſiſted Dr Black in conducting his experiments upon latent heat, and he and his ſon, Mr William Irvine, aſcertained the latent heat of other bodies beſides water:—as may appear from the following Table.

Bodies.	Latent heat.	Do. reduced to the ſpecific heat of water.
Sulphur - - - -	143·68	27·14
Spermaceti - - -	145	
Lead - - - - -	162	5·6
Bees wax - - - -	175	
Zinc - - - - -	493	48·3
Tin - - - - - -	500	33
Biſmuth - - - -	550	23·25

The ſecond column expreſſes the degrees by which the heat would have raiſed the temperature of each of the bodies when ſolid.

(309.) Dr Black has proved that bodies become ſoft and ductile, in conſequence of combining with caloric; and that metals owe their malleability to this cauſe. Hence a ſmith kindles his fire by ſmartly hammering a piece of ſoft iron. By compreſſing the particles of the metal, they give out their latent, or combined caloric, which raiſes the iron to a red temperature.

(310.) But a great many ſolid bodies are not only converted into fluids by combining with caloric. Fluids and ſeveral ſolid bodies, are alſo converted into inviſible elaſtic vapours, like air, by combining with additional quantities of caloric. Thus water is converted into ſteam, 1800 times more bulky than the original water, and elaſtic as air. Theſe vapours retain their elaſtic form as long as their temperature remains ſufficiently high; but when cooled down, they revert to their liquid ſtate.

(311.) Some bodies undergo a gradual converſion into vapour at all temperatures. Thus water, if left in an open veſſel, conſtantly diminiſhes, and at laſt diſappears. Alcohol, ether, and volatile oils, aſſume the ſtate of vapour likewiſe, at all temperatures: and if any of theſe liquids be put into an exhauſted receiver, they riſe in vapour, and fill the veſſel. This is called *ſpontaneous* evaporation. But ſulphuric acid, and the fixed oils, never evaporate in this manner, nor until their temperature be raiſed to a certain point. Thus ſulphuric acid emits no vapour at the boiling point of water; nor until it be heated to its own boiling point.

(312.) The boiling of liquids is cauſed by elaſtic vapour, generated at the bottom, where the heat is commonly applied; which riſing, like air-bubbles, produces a violent agitation in the maſs. When the denſity, or preſſure of the atmoſphere is the ſame, each liquid boils at a certain fixed temperature, which is called the *boiling point* of that liquid. Thus, under the medium preſſure of the atmoſphere, water boils at 212°. As the preſſure of the atmoſphere diminiſhes with the increaſe of elevation above the ſea, water boils with a lower temperature in high than in low elevations. Hence the late Dr Walker attempted to meaſure the height of mountains, by the temperature at which water boils at different elevations. It was firſt obſerved by Dr Hooke, that, with the ſame preſſure of the atmoſphere, after water or any liquid is heated to its boiling point, it never acquires any higher temperature in open veſſels. Increaſe of heat makes it boil more rapidly, but does not increaſe the temperature of the liquid.

The following Table exhibits the boiling point of various liquids.

Bodies.	*Boiling point.*	*Bodies.*	*Boiling point.*
Ether - -	98°	Sulphuric acid	590°
Ammonia -	140	Phoſphorus -	554
Alcohol -	176	Oil of turpentine	560
Water - -	212	Sulphur - -	570
Muriate of lime	230	Linſeed oil -	600
Nitric acid -	248	Mercury -	660
Carbonate of potaſh	260		

(313.) It was obſerved that variations in the preſſure of the atmoſphere, occaſion conſiderable variations in the boiling point of liquids. The late Profeſſor Robinſon aſcertained that in *vacuo* liquids boil about 145 degrees lower than in the open air, under a preſſure equal to 30 inches of mercury. Therefore water would boil in *vacuo* at 67°, and alcohol at 34°. In a Papin's digeſter water may be raiſed to 300°, or even 400°, without boiling; but when the preſſure is taken off, it boils with prodigious violence. Water, encloſed in a ſtrong piſtol-barrel, has even been heated to redneſs; but it burſt the barrel with terrible force.

(314.) The elaſticity of all vapours, formed from liquids at their boiling temperature, is equal to that of the air; or capable, at a medium, of balancing a column of mercury 30 inches high.—The following important Table, by Mr Dalton of Mancheſter, exhibits the elaſtic force of ſteam, in inches of mercurial preſſure, at all temperatures from 40° below 0, or the freezing point of mercury, to 325°. The elaſticities from 32° to 212° were aſcertained by experiment, the reſt were deduced from calculation.

TABLE OF THE ELASTIC FORCE OF STEAM.

Temperature.	Force of Vapour in inches of Mercury.	Temperature.	Force of Vapour in inches of Mercury.	Temperature.	Force of Vapour in inches of Mercury.
-40°	·013	50	·375	106	2·25
-30	·020	51	·388	107	2·32
-20	·030	52	·401	108	2·39
-10	·040	53	·415	109	2·46
		54	·429	110	2·53
0	·064	55	·443	111	2·60
1	·066	56	·458	112	2·68
2	·068	57	·474	113	2·76
3	·071	58	·490	114	2·84
4	·074	59	·507	115	2·92
5	·076	60	·524	116	3·00
6	·079	61	·542	117	3·05
7	·082	62	·560	118	3·16
8	·085	63	·578	119	3·25
9	·087	64	·597	120	3·33
10	·090	65	·616	121	3·42
11	·093	66	·635	122	3·50
12	·096	67	·655	123	3·59
13	·100	68	·676	124	3·69
14	·104	69	·698	125	3·79
15	·108	70	·721	126	3·89
16	·112	71	·745	127	4·00
17	·116	72	·770	128	4·11
18	·120	73	·796	129	4·22
19	·124	74	·823	130	4·34
20	·129	75	·851	131	4·47
21	·134	76	·880	132	4·60
22	·139	77	·910	133	4·73
23	·144	78	·940	134	4·86
24	·150	79	·971	135	5·00
25	·156	80	1·00	136	5·14
26	·162	81	1·04	237	5·29
27	·168	82	1·07	138	5·44
28	·174	83	1·10	139	5·59
29	·180	84	1·14	140	5·74
30	·186	85	1·17	141	5·90
31	·193	86	1·21	142	6·05
		87	1·24	143	6·21
32	·200	88	1·28	144	6·37
33	·207	89	1·32	145	6·53
34	·214	90	1·36	146	6·70
35	·221	91	1·40	147	6·87
36	·229	92	1·44	148	7·05
37	·237	93	1·48	149	7·23
38	·245	94	1·53	150	7·42
39	·254	95	1·58	151	7·61
40	·263	96	1·63	152	7·81
41	·273	97	1·68	153	8·01
42	·283	98	1·74	154	8·20
43	·294	99	1·80	155	8.40
44	·305	100	1·86	156	8.60
45	·316	101	1·92	157	8.81
46	·328	102	1·98	158	9·02
47	·339	103	2·04	159	9·24
48	·351	104	2·11	160	9·46
49	·363	105	2·18	161	9·68

TABLE Continued.

Temperature.	Force of Vapour in inches of Mercury.	Temperature.	Force of Vapour in inches of Mercury.	Temperature.	Force of Vapour in inches of Mercury.
162	9·91	217	33·09	273	80.93
163	10·15	218	33·72	274	82·01
164	10·41	219	34·35	275	83·13
165	10·68	120	34·99	276	84·35
166	10·96	221	35·63	277	85·47
167	11·25	222	36·25	278	86·50
168	11·54	223	36·88	279	87·63
169	11·83	224	37·53	280	88·75
170	12·13	225	38·20	281	89·87
171	12·43	226	38·89	282	90·99
172	12·73	227	39·59	283	92·11
173	13·02	228	40·30	284	93·23
174	13·32	229	41·02	285	94·35
175	13·62	230	41·75	286	95·48
176	13·92	231	42·49	287	96·64
177	14·22	232	43·24	288	97·80
178	14·52	233	44·00	289	98·96
179	14·83	234	44·78	290	100·12
180	15·15	235	45·58	291	101·28
181	15·50	236	46·39	292	102·45
182	15·86	237	47·20	293	103·63
183	16·23	238	48·02	294	104·80
184	16·61	239	48·84	295	105·97
185	17·00	240	49·67	296	107·14
186	17·40	241	50·50	297	108·31
187	17·80	242	51·34	298	109·48
188	18·20	243	52·18	299	110·64
189	18·60	244	53·03	300	111·81
190	19·00	245	53·88	301	112·98
191	19·42	246	54·68	302	114·15
192	19·86	247	55·54	303	115·32
193	20·32	248	56·42	304	116·50
194	20·77	249	57·31	305	117·68
195	21·22	250	58·21	306	118·86
196	21·68	251	59·12	307	120·03
197	22·13	252	60·05	308	121·20
198	22·69	253	61·00	309	122·37
199	23·16	254	61·92	310	123·53
200	23·64	255	62·85	311	124·69
201	24·12	256	63·76	312	125·85
202	24·61	257	64·82	313	127·00
203	25·10	258	65·78	314	128·15
204	25·61	259	66·75	315	129·29
205	26·1	260	67·73	316	139·43
206	26·66	261	68·72	317	131·57
207	27·20	262	69·72	318	132·72
208	27·74	263	70·73	319	133·86
209	28·29	264	71·71	320	135·00
210	28·84	265	72·76	321	136·14
211	29·41	266	73·77	322	137·28
212	30·00	267	74·79	323	138·42
		268	75·80	324	139·56
213	30·60	269	76·81	325	140·70
214	31·21	270	77·8		
215	31·83	271	78·89		
216	32·46	272	79·94		

(315.) Mr Dalton alſo diſcovered that the elaſticity of all vapours at their boiling points, is the ſame; and that their elaſticities are alſo the ſame, at equal temperatures above and below their boiling points. Thus water boils at 212°, and we ſee from the table that its elaſticity at 182°, or 30 degrees under its boiling point, is 15·86. Alcohol boils at 176°, (Table 312,) and at 146°, or 30° under its boiling point, its elaſticity is alſo 15·86. Thus the elaſticity of vapour, from every liquid whoſe boiling point is known, may be aſcertained at all temperatures, by reference to this Table.

(316.) Dr Black, with his uſual ſagacity, accounted for the converſion of liquids into vapour, from their combining with additional quantities of heat, and rendering it *latent;* in the ſame way as he accounted for the converſion of ſolids into liquids.

(317.) *First.* He obſerved that when a quantity of water was put upon the fire, it grew hotter until it arrived at 212°, or its boiling point; after which it does not increaſe in temperature though the whole be evaporated. But the heat of the vapour is alſo 212°; and as caloric is conſtantly entering into the body, it muſt combine, and be carried off with the vapour, without increaſing its temperature. This portion of caloric, then, becomes *latent* in the ſteam, juſt as a portion became *latent* in water, when it was melted from ice. Dr Black aſcertained that 810 degrees of heat entered into the compoſition of ſteam, which was not indicated by a thermometer, and which, therefore, he called the *latent heat of ſteam.*

(318.) *Second.* Water may be heated in a Papin's digeſter to 400° without boiling. When in this ſtate, if a valve in the veſſel be ſuddenly opened, about $\frac{1}{5}$th of the water eſcapes in the form of ſteam, and the temperature ſuddenly ſinks to 212°. Here then the ſteam which eſcapes carries off 5 times 188 degrees of temperature, or about 940°. This experiment was more accurately repeated by Mr Watt; and it ſhews that the ſteam went off in combination with at leaſt 940° of heat, which did not raiſe its apparent temperature above 212°.

(319.) *Third.* When hot liquids are put under the exhauſted receiver of an air-pump, they boil with violence, the receiver is filled with their vapour, and at the ſame time the temperature ſinks to their boiling point in *vacuo.* Thus hot water ſuddenly ſinks to 70, and ether ſinks ſo low that ice is formed on the outſide of the veſſel that contains it.—But the temperature of the vapour, in theſe caſes, is never greater than that of the liquid from which it is formed. Therefore the heat which diſappears muſt have become *latent,* or muſt have entered into the compoſition of the vapour.

(320.) *Fourth.* When a given weight of water in ſteam, is paſſed through a worm, it gives out to a given weight of water ſurrounding the worm, about 940 degrees of heat, as aſcertained by Mr Watt; though the experiments of Dr Black, and Lavoiſier make it rather more than 1000°. This heat muſt have been latent in the ſteam, as its temperature, in open ſpace, is never more than 212°.

(321.) Dr Black aſcertained that all liquids, when they are converted into vapour, abſorb caloric, which does not affect the thermometer. It may therefore be laid down as a general rule—That all elaſtic vapours are only liquids combined with certain portions of caloric. That when this portion of caloric is extracted, theſe vapours return again to the ſtate of liquid bodies; and that when another portion of *latent* caloric is extracted, the liquids become ſolid bodies.

(322.) It may therefore be admitted as an univerſal principle—*That all changes in the state of bodies are produced by the combination, or separation, of caloric.* For theſe diſcoveries, which form an important era in the hiſtory of chemiſtry, we are indebted to the patient inveſtigation, and profound ſagacity of the late Dr Black; and though his great modeſty encouraged others to appropriate his diſcoveries, his claims to originality and priority have been ſatisfactorily vindicated by the late Profeſſor Robinſon, in his life of Dr Black. He has clearly proved that many ſolid, and all liquid bodies, become elaſtic fluids in conſequence of combination with caloric; and that they continue in this elaſtic ſtate as long as their temperature is kept up to a certain point; which may be called the *vapouriſic temperature* of each body. He has rendered it extremely probable that all bodies whatever might be converted into liquids, or elaſtic vapours, could we ſubject them to a heat ſufficiently intenſe.

(323.) The converſe of this propoſition was maintained by Dr Black, by Lavoiſier and his aſſociates—That ſuch bodies as compoſe atmoſpheric air, are only ſolids or liquids combined with certain proportions of caloric. If this opinion be well founded, it follows, that if we could ſubject theſe elaſtic bodies to a ſufficiently low temperature, they would return to the ſtate of liquid, or of ſolid bodies. In fact, there are ſome gaſes which may be thus made to change their ſtate. Thus oxymuriatic acid gas becomes liquid at a temperature not much under 40°, and at 32° it forms ſolid cryſtals. Ammoniacal gas alſo becomes a liquid at 45°. Along with cooling, preſſure or condenſation promote the change of ſtate in gaſeous bodies. Though atmoſpheric air has been condenſed until it was heavier than water, and it is daily projected in this highly condenſed ſtate into the blaſt furnaces for ſmelting iron; it has not, during this extreme condenſation, been ſubjected to extreme degrees of cold, produced by freezing mixtures placed around the veſſel in which it is condenſed. Were this powerful condenſation to co-operate with extreme cold, it is poſſible that atmoſpheric air itſelf would loſe its elaſticity, and be changed either into a liquid, or ſolid body.

(324.) The only plauſible objection to this doctrine is, that certain gaſes combine together, and form ſolid compounds, without any great extrication of caloric. Thus the ammoniacal and muriatic acid gaſes, when mixed, form a ſolid ſalt, or ſal ammoniac, without evolving ſo great a proportion of heat as muſt be abſtracted before theſe gaſes can be made to condenſe ſeparately. In other caſes the union of two gaſes forms a third gas, without much extrication of caloric. Thus oxygen gas and nitrous gas, when united, form nitric acid, which retains its gaſeous elaſtic form until it can unite with water or ſome other body with which it has an affinity. But we may obſerve that when bodies change their ſtate in conſequence of chemical combination, the quantities of caloric they evolve are very different from theſe which are extricated by means of a cooling proceſs. Thus, in the caſe juſt alluded to, when the oxygenous combines with the nitrous gas, very little heat is evolved. When the nitric acid thus formed combines with potaſh, forming nitre, the two gaſes are changed from elaſtic into ingredients of a ſolid ſalt. Yet this ſalt is nearly as capable of ſupporting combuſtion, as the oxygen in its compoſition were it applied in its elaſtic ſtate. We are therefore entitled to conclude, that when theſe gaſes entered into compoſition, in this caſe, and became parts of a ſolid body, they ſtill retained the whole, or greateſt part of the caloric, which was *latent* in them during their ſtate of elaſticity. The ſame might be illuſtrated by other examples; but this is ſufficient to ſhew that gaſes combine with other bodies, without parting with the whole, and ſometimes without parting with any, of their *latent* or *combined* heat. The argument, therefore, does not militate againſt Dr Black's theory, becauſe the caſes are not exactly ſimilar.

(325.) Thus Heat not only produces an enlargement of the ſize of bodies; a change in their ſtate from ſolidity to fluidity, and fluidity to elaſtic vapours, or gaſes:—it alſo produces

III. Changes *in the* Composition *of* Bodies.

(326.) Caloric either reſolves ſome bodies into their original elements, or cauſes their elements to form new combinations. Of the firſt we have an example of ammonia, or vol-alkali, which being heated to redneſs, is reſolved into the azotic and hydrogen gaſes. Of the ſecond, alcohol is an example, which a red heat converts into carburetted hydrogen and water.

(327.) Decompoſition is often effected in conſequence of the different volatility of the ingredients in a compound. Thus ſpirits are extracted from waſh, in the proceſs of diſtillation, becauſe the ſpirits riſe in vapour, and ſeparate from the compound, at a lower temperature than the vaporific point of water.

(328.) In general compounds which have been, or may be effected by combuſtion, are leaſt apt to be decompoſed by heat. Thus water; the ſulphuric, phoſphoric, and carbonic acids, are not decompoſed by any heat we can apply.

(329.) Compounds into which oxygen enters without combuſtion, are generally decompoſed by heat. As examples of this we may mention the nitric and hyperoxymuriatic acids, and many of metallic oxides.

(330.) Compounds which contain one or more combuſtible ingredients, are decompoſed by heat. Perhaps ſome metallic compounds ſhould be excepted from this rule, as we have not been able to apply a heat ſufficient to decompoſe them. A great part of animal and vegetable ſubſtances, in which occur combuſtible ingredients in union with oxygen, may be decompoſed by heat. But the phenomena of theſe decompoſitions had better be reſerved until we come to treat of the bodies to which they refer.

(331.) Having thus ſtated the general effects of caloric upon bodies, as far as our very limited knowledge of this ſubject extends, we proceed now to other enquiries reſpecting this ſubſtance.

Sect. VII. *Of the* Quantity *of* Caloric *in* Bodies.

(332.) This branch of the ſubject naturally divides itſelf into three parts. 1. To enquire into the *relative* quantities of caloric in bodies; or the quantities neceſſary to be added to each body, in order to produce a given change of temperature, indicated by the thermometer. 2. Into the *abſolute* quantity of caloric which exiſts in bodies; or the point of real *zero*, at which a thermometer would ſtand, were it capable of meaſuring it, when immerſed in a body from which all its caloric had been abſtracted. 3. The phenomena of *cold*, or the relative abſence of caloric.

(333.) Dr Black firſt announced in his lectures at Glaſgow, between 1760 and 1765, that different bodies required different proportions of caloric to raiſe them to the ſame temperature, as indicated by the thermometer. The ſame ſubject was proſecuted with much acuteneſs, by Dr Irvine, his ſucceſſor in the chemical chair at Glaſgow, between 1765 and 1770. Dr Crauford, a pupil of Dr Irvine, publiſhed many experiments upon it in his *Treatiſe on Heat*. Theſe philoſophers aſcribed this property to the *capacity of bodies for heat*. Bodies which required a greater doſe of caloric to raiſe them to a given temperature, were ſaid to have a *greater capacity for heat*, than bodies which required a ſmaller doſe to raiſe them to the ſame temperature. Profeſſor Wilcke of Stockholm introduced the term *ſpecific caloric*, to expreſs this property of bodies; and this term is now generally adopted.

I. *Of the ſpecific caloric of bodies.*

(334.) If equal weights of water, but of different temperatures, be mixed together, the temperature of the mixture will be the medium between that of the two maſſes when ſeparate. Hence in homogeneous fluids, the caloric diſtributes itſelf equally through all parts; or the *ſpecific* caloric of any two maſſes is the ſame. If equal weights of water, and of ſpermaceti oil, but of different temperatures, be mixed and agitated, one would naturally expect the ſame reſult, or that the temperature of the mixture ſhould be the medium of the two ſeparate temperatures. But it is not ſo in fact. For ſuppoſe the water to be 100°, and the oil 50°, the temperature after the mixture will not be 75°, or the water will not have loſt 25°, and the oil have gained 25°: but the temperature after mixture will be 83½°. Conſequently the water will only have loſt 17½, while the oil has gained 22½. On the other hand, if the water be at 50°, and the oil at 100°, the temperature, after agitation, will be only 66⅓°; that is, the oil will have given out 32⅓° while the water has received only 16⅓°. This ſhews that ſpermaceti oil does not require the ſame quantity of caloric to raiſe it a given number of degrees, that water requires to raiſe it the ſame number of degrees. The quantity of caloric which raiſes the oil 12⅔° only raiſes water 6⅓°. Conſequently the *capacity* of water for heat, or its *ſpecific caloric*, is double that of oil, as the quantity of caloric which raiſes water only

1°, raiſes the oil 2°. Although we do not know the preciſe quantity of caloric neceſſary to raiſe the temperature of any body, one degree for example, we can form ſome idea of this by comparing them with each other. Thus water requires double the quantity to produce the effect that is neceſſary for oil. All bodies differ from each other in the quantity of caloric neceſſary to produce a given temperature; though the ſame body, in ſimilar circumſtances, requires only the ſame quantity. The reaſon ſeems to be, that when caloric is ſuperadded to bodies, a greater proportion of it enters into combination, or becomes *latent* in ſome bodies, and hence does not effect the thermometer; than takes place in other bodies. But by comparing bodies with each other, we are enabled to deduce the *ſpecific caloric* of each; which is merely a relative term, and has no connection with the abſolute quantity of caloric in bodies.

(335.) Mr Wilcke in 1771, read to the Swediſh Academy, an account of experiments with a view to aſcertain the ſpecific caloric of ſeveral of the metals, which was publiſhed in the Stockholm Tranſactions for 1772. About a pound of the metal was generally taken, and accurately weighed; and being ſuſpended by a thread, was let down into a large veſſel filled with boiling water, and kept there until an accurate thermometer indicated it had acquired a certain temperature. Into another veſſel of tin-plate exactly as much water at 32° was put, as equalled the weight of the metal. Into this, the heated metal was immerſed, and ſuſpended ſo as not to touch the bottom or ſides of the veſſel; and the moment the water and metal were reduced to the ſame temperature, the degree of heat was marked by a nice thermometer. Taking the ſpecific caloric of water as unity, from theſe data he deduced that of the metal, by an ingenious calculation.

(336.) Dr Crauford, in his *Treatiſe on Heat*, communicated many ingenious contrivances and experiments for aſcertaining the ſpecific caloric of bodies, by mixing them together at different temperatures. His method was eſſentially the ſame with that firſt ſuggeſted by Dr Black; but not adverting to the chemical changes produced by mixing many of the ſubjects of his experiments, the errors thence reſulting were corrected in his ſecond edition. Two ſubſtances, of different temperatures, being mixed together, the change of temperature produced upon each ſubſtance in conſequence of mixture, was conſidered as inverſely proportional to its ſpecific caloric.

(337.) Some experiments on ſpecific caloric were alſo made by Lavoiſier and Laplace; the latter of whom ſuggeſted an inſtrument, different from any that had been hitherto thought of, to which Lavoiſier gave the name of *calorimeter*. Its principle is to aſcertain the ſpecific caloric of a body by the weight of ice or ſnow which a given weight and temperature will melt. It conſiſts of three nearly concentric cylinders of tin-plate (*Plate* LXVIII. *Fig*. 1.) of which *Fig*. 3. is a ſection. The interior cavity *f f f f*, repreſented *Fig*. 4. is a cage or grating of wire, into which the body to be examined is put, ſupported on croſs bars, which ſuſpend the cage exactly in the centre of the inſtrument. Its mouth LM is covered by the lid HG. The middle cavity *b b b b* is filled with ice, which reſts upon the grate *m m*, repreſented in the centre of *Fig*. 2. The external cavity *a a a a* is alſo filled with ice, to intercept caloric from the external air, which might otherwiſe paſs, and aſſiſt in melting the ice in the interior cavity *b b b b*. It was obſerved, that ice at 32° is a nonconductor of caloric, as what enters is fixed, and only ſerves to melt the ice. The exterior and interior cavities being filled with ice, and all the water allowed to drain off; the interior cavity being at 32°, the ſubſtance whoſe ſpecific caloric is to be examined, being heated to a certain temperature, ſuppoſe 212°, is put into the interior cavity, or grating, encloſed in a thin veſſel. As it cools, it melts the ice in the interior cavity, and the water runs through the grate or ſieve *m m*, into the conical pipe *c c d*, where it can be confined by the ſtop-cock *u y*, or let out into the veſſel F *Fig*. 1. If any of the ice be melted in the external cavity *a a a a a a*, it is conducted off into a ſeparate veſſel by the pipe ST, on opening the cock at *r*. While the operation is going on, the apparatus is covered by the lid FF, *Fig*. 7. which has its upper part alſo filled with ice, or ſnow, to prevent the abſorption of caloric from the external air. In operating with this inſtrument, the external air ought not to be lower than 32°, nor higher than 41°. In the firſt caſe, the ice might become colder than 32°; in the ſecond, a ſtream of air would riſe through the apparatus, and diſturb the experiment.

(338.) It is evident that by putting various ſubſtances, of the ſame weight and temperature, into this machine, the quantity of ice melted, which is aſcertained by the weight of water which runs from the pipe *x y*, by the ſtop-cock *u y*, will indicate the ſpecific caloric of each ſubſtance. Thus if water, in cooling from 212° to 32°, melt 1 pound of the ice, and ſpermaceti oil 0·5 of a pound, the ſpecific caloric of water will be 1, and that of the oil 0·5. But Mr Wedgewood found that the melted ſnow or ice, inſtead of flowing out, was partly frozen again, and choaked up the paſſage; a circumſtance which renders the concluſions drawn from ſuch experiments uncertain.

(339.) Mr Kirwan drew up a Table of the ſpecific caloric of various bodies; and Mr Meyer made experiments on the ſpecific caloric of dried woods. Having aſcertained the rate of cooling of the ſame bulk of different bodies, he multiplied the conducting power into the ſpecific gravity of the body, and reckoned the product the expreſſion of its ſpecific caloric. Mr Leſlie, in his Eſſay on Heat, followed nearly the ſame rule.

(340.) The following Table exhibits the ſpecific caloric of various bodies, from the experiments of different philoſophers.

1. Gases

		Sp. Caloric.
I. Gases.		
Hydrogen		21·4000
Oxygen		4·7490
Common air		1·7900
Carbonic acid		1·0459
Azote		0·7836
II. Water.		
Ice		0·9000
Water		1·0000
Steam		1·5500
III. Saline Solutions.		
Carbonate of ammonia		1·851
Sulphuret of ammonia		0·994
Sulphate of magneſia Water	1 2	0·884
Common ſalt Water	1 8	0·832
Nitre Water	1 8	0·8167
Nitre Water	1 3	0·646
Muriate of ammonia Water	1 1·5	0·798
Tartar Water	1 237·3	0·765
Sulphate of iron Water	1 2·5	0·754
Sulphate of ſoda Water	1 2·9	0·728
Alum Water	1 2·9	0·649
Nitric acid Lime	9⅓ 1	0·6189
Solution of brown ſugar		0·086
IV. Acids and Alkalis.		
Nitric acid, pale		0·844
Muriatic	(1·122)	0·680
	(1·185)	0·758
Sulphuric	(1·872.)	0·429 0·34
	(1·87)	0·3345
Do. 4. Water	5	0·6631
Do. 4. do.	3	0·6031
Vinegar		0·387
Do. diſtilled		0·103
Potaſh	(1·346)	0·759
Ammonia	(0·997)	0·708
V. Inflammable liquids.		
Alcohol		0·6666 0·64 0·6024 0·086
Oil of olives		0·716 0·500
Linſeed oil		0·528
Spermaceti oil		0·5000
Oil of turpentine		0·472
Spermaceti		0·399
VI. Animal fluids.		
Arterial blood		0·0300
Venous blood		0·8928
Cow's milk		0·9999
VII. Animal solids.		
Ox-hide with hair		0·7870
Lungs of a ſheep		0·7690
Lean of ox-beef		0·7400
VIII. Vegetable solids.		
Pinus ſylveſtris		0·65
Pinus abies		0·60
Tilea Europœa		0·62
Pinus picea		0·58
Pyrus malus		0·57
Retula alnus		0·53
Quercus robur ſeſſilis		0·51
Fraxinus excelſior		0·51
Pyrus communis		0·50
Rice		0·5050
Horſe beans		0·5020
Duſt of the pine tree		0·5000
Peaſe		0·4920
Fagus ſylvatica		0·49
Carpinus betulus		0·48
Retula alba		0·48
Wheat		0.4770
Elm		0·57
Quercus robur pedunculata		0·45
Prunus domeſtica		0·44
Diaſpyrus ebenum		0·43
Barley		0·4210
Pit coal		0·2777
Charcoal		0·2631
Oats		0·4160
Cinders		0.1923
IX. Earthy bodies.		
Chalk		0·2564
Quicklime		0·2229 0·2168
Aſhes of pit coal		0·1855
Aſhes of elm		0·1402
Agate		0·195
Stoneware		0·195
Cryſtal		0·d929
Swediſh glaſs		0·187
Flint glaſs		0·174
X. Sulphur		0·183
XI. Metals.		
Iron		0·125 0·1269 0·126
Braſs		0·1123 0·116
Copper		0·1111 0·114
Sheet iron		0·1099
Gun metal		0·1100
Zinc		0·0943 0·102
Silver		0·082
Tin		0·067 0·0704 0·060
Antimony		0·086 0·0645 0·063
Gold		0·050
Lead		0·050 0·0352 0·042
Biſmuth		0·043
Mercury		0·033 0·035 0·0290
XII. Oxides.		
Oxide of iron		0·322
Ruſt of iron		0·2500
Do. nearly free from air		0·1666
White oxide of antimony waſhed		0·220 0·2272
Do. nearly freed from air		0·1666
Oxide of copper do.		0·2272
Oxide of lead and tin		0·102
Oxide of zinc do.		0·1339
Oxide of tin nearly freed from air		0·0990 0·096
Yellow oxide of lead do.		0·0680 0·068

From the preceding table it will be ſeen, that in many caſes, philoſophers differ from each other reſpecting the ſpecific caloric of the ſame ſubſtance. This creates a doubt if any of the methods yet employed for inveſtigating this ſubject, be ſufficiently accurate. It will alſo be ſeen that, with a few exceptions, the ſpecific caloric of gaſes is greater than that of liquids, and the ſpecific caloric of liquids is greater than that of ſolids.

(341.) The next queſtion which has engaged the attention of philoſophers is whether the ſpecific caloric of bodies be the ſame at all temperatures, or if it varies at different temperatures?—Dr Crauford aſſerts the ſpecific caloric to be nearly permanent in the ſame body, provided the body does not undergo a change of ſtate. He aſſumes, as the foundation of his reaſoning on this point, two propoſitions which we have ſhewn to be erroneous: 1. That the mercurial thermometer is an accurate meaſure of heat; 2. That heat does not form a chemical combination with bodies. Although his data be inadmiſſible, it muſt be granted that no ſenſible variation in the ſpecific caloric of bodies, while they retain the ſame ſtate, has been perceived, except in a few caſes pointed out by Dr Crauford himſelf.

(342.) The late Dr Irvine of Glaſgow diſcovered, in his lectures, applied with much ſagacity to the explanation of many intereſting phenomena, the law which regulates the ſpecific caloric of bodies when they undergo a change of ſtate; and to which we had occaſion to allude in a former branch of this treatiſe.—He diſcovered, that when a body paſſes from a ſolid to a liquid ſtate, or from a liquid to an elaſtic fluid, or gas, its ſpecific caloric, or as he expreſſed it, *its capacity for heat, increaſes*; and the body becomes ſenſibly colder. But, on the other hand, when an elaſtic fluid becomes a liquid, or a liquid becomes a ſolid body, the ſpecific caloric diminiſhes, and the body becomes ſenſibly warmer.

(343.) Dr Crauford diſcovered, and founded upon it his Theory of animal heat, that the ſpecific caloric of bodies is increaſed when they combine with oxygen. Thus the ſpecific caloric of metallic the oxides is greater than that of the metals; and the ſpecific caloric of acids is greater than that of their baſes.

(344.) Dr Crauford alſo aſcertained that when oxygen entered into combination with inflammable bodies, its ſpecific caloric was diminiſhed.

(345.) It is alſo received as a general rule, that the ſpecific caloric of bodies is reciprocally as their conducting power.—We now proceed to the next branch of this ſection, which is to enquire into

II. *The* ABSOLUTE QUANTITY *of* CALORIC *in* BODIES.

(346.) Having ſeen that the relative quantity of caloric is very different in different bodies, even when the thermometer indicates the ſame temperature; and that the caloric which occaſions the fluid and elaſtic ſtate of bodies, is not indicated by the thermometer at all, it muſt appear that the thermometer is incapable of aſcertaining the abſolute quantity of caloric in bodies. Thus water at 212°, and ſteam at 212°, are of the ſame temperature, tho' the ſteam contains 1000° more caloric than the water. The queſtion now under diſcuſſion is, are there any means of aſcertaining the true zero? or what is the ſtationary point in the ſcale of temperature? or at what degree would a thermometer ſtand, ſuppoſing it capable of meaſuring ſo low, were the mercury deprived of all its caloric?

(347.) The firſt perſon who turned his attention towards this queſtion, was the late Dr Irvine of Glaſgow. He had obſerved that the ſpecific caloric of bodies, while they did not change their ſtate, was the ſame at all temperatures. Thus, the ſpecific caloric of water being double that of ſpermaceti oil, the quantity of caloric neceſſary to raiſe water one degre, at every point of the ſcale, from 32° to 212°, is double of what would be neceſſary to raiſe the oil the ſame degree. Thus at all theſe intermediate temperatures he ſuppoſed the water would contain twice as much caloric as the oil.

(348.) He alſo ſuppoſed that when a body changed from a ſolid to a fluid, the caloric abſorbed, or which became *latent*, was merely a conſequence of the increaſe of the ſpecific caloric, or of the *capacity of the body for heat.* Thus when ice is converted into water, 140 degrees of caloric are abſorbed, becauſe the ſpecific caloric of water is ſo much greater than that of ice, as to require 140 of additional caloric to raiſe the water to the ſame temperature with the ice, whoſe ſpecific caloric is 140 degrees leſs. The ſame ſuppoſition was applied to the caſe when liquid or ſolid bodies are converted into elaſtic vapours. Dr Irvine conſidered theſe two ſuppoſitions to be firſt principles. The firſt gave him the ratio of the abſolute caloric of bodies; the ſecond the difference between two abſolute calorics. From theſe data he introduced the point of abſolute zero by a very ingenious calculation. Thus if we ſuppoſe the ſpecific caloric of water to be to that of ice as 10 to 9; and that when ice is converted into water the quantity of caloric abſorbed is 140°: then the 140 degrees of heat which are evolved when water is frozen, are equal to $\frac{1}{10}$th of the whole heat in the water. Therefore the whole heat in the water is equal to 140° × 10, or 1400. Thus water at 32° is calculated to contain 1400 degrees of caloric, and deducting the 140° which leaves it when it becomes ice, the ice at 32° will contain 1260° degrees of heat. Thus Dr Irvine fixed the point when water would be abſolutely deprived of caloric, at 1260° below 32° of Farenheit, or 1228° below 0. Dr Crauford, who proceeded on the ſame principle, but who operated on a different claſs of bodies from Dr Irvine, fixed the real zero, or total abſence of caloric, at 1500° below 0. of Farenheit.—Such a remarkable diſcrepancy, between two ſuch profound philoſophers, excites doubts concerning the ſoundneſs of their data.

(349.) That the ſpecific caloric of bodies continues the ſame at all temperatures, is ſo far from being proved, that the very contrary was aſcertained by Dr Irvine himſelf in the caſe of ſpermaceti and wax, and has been obſerved by Dr Crauford in other caſes. But though this propoſition were true, it is not proved that the ſpecific caloric is proportional to the abſolute caloric. Thus, it does not follow that the abſolute caloric of ice is to that of water as 9 to 10, becauſe their ſpecific caloric is in this proportion. The other propoſition, that the caloric which becomes latent in a body, during its change of ſtate is merely owing to the change in the ſpecific caloric of the body, is equally unſupported by proof. Dr Irvine and Dr Crauford, indeed, aſſumed it as an axiom that caloric was incapable of forming a chemical combination with bodies; an aſſumption which conveyed to their theory an air of probability, but which is inconſiſtent with the diſcoveries of Dr Black.

(350.) Dr Irvine alſo founded his reaſonings upon another ſet of phenomena which he had inveſtigated by a great variety of experiments. He found that when bodies form a chemical union, a change of temperature almoſt always takes place: the compound becoming either hotter or colder than the ingredients were before the union. By a great variety of experiments he aſcertained that a correſponding change took place in the ſpecific caloric of the compound. When the ſpecific caloric, or as he expreſſed it, *the capacity of the compound for heat*, was increaſed, the compound became colder; and when the ſpecific caloric was diminiſhed, the compound became warmer, or gave out heat. Preſuming as before, that the ſpecific and abſolute caloric of bodies were in a certain ratio to each other, and knowing the ſpecific caloric of two bodies before combination, the ſpecific caloric of the compound, and the heat evolved or abſorbed during combination: he proceeded, on theſe data, to calculate the degrees of abſolute caloric in bodies. Thus if the ſpecific caloric of two uncombined bodies=2 and their ſpecific caloric after combination=1, he inferred that, during combination they muſt have parted with half of their abſolute heat. Suppoſe the heat evolved to be 708°, then the whole heat in the bodies muſt be double this ſum, or 1400°.

(351.) But this calculation reſts on the ſuppoſition that the quantity of heat abſorbed or evolved from bodies, by mixing them in various proportions,

portions, allowance being made for changes in the ſpecific caloric, is always the ſame: a ſuppoſition which is not confirmed by obſervation. Thus Lavoiſier and Laplace, from a mixture of water and quicklime, in the proportion of 9 to 16, inferred the real zero to be 3426° below 0. From a mixture of four parts of ſulphuric acid with three of water, they deduced the ſame zero to be 7260° below 0. From merely varying the proportion of the ſame ſubſtances to four parts of ſulphuric acid with five of water, they placed the zero at 2598° below 0. Their experiments on 9½ parts of nitric acid, and one of lime, places it at 23837° above 32°. Such enormous differences deducted from ſimilar phenpmena, by the ſame mode of calculation and the latter making the abſolute zero far above a red heat, ſhew that the foundatin of the reaſoning is untenable.

(352.) Mr Dalton, in the Vth volume of the Mancheſter Memoirs, has offered a new method for aſcertaining the abſolute quantity of caloric in bodies. He aſcribes the repulſion between the particles of elaſtic fluids to the caloric with which theſe particles are combined; and infers that the abſolute quantity of caloric in elaſtic fluids, at different temperatures, is proportional to the cube roots of their bulks at theſe temperatures. Hence he calculates the abſolute heat in the air 55°, or the point of real zero, to be 1515° below 0.

(353.) His reſults correſpond nearly with thoſe of Dr Crauford; but both aſſume the mercurial thermometer to be a true meaſure of caloric, which is not the caſe.—It may alſo be obſerved that though caloric cauſes the repulſion between the particles of elaſtic fluids, this effect ought not to be aſcribed to the whole of the caloric which they contain; but only to that part of it whoſe combination conſtitutes them elaſtic fluids. We have already hinted at the probability that could we deprive elaſtic bodies of a ſufficient proportion of their ſpecific caloric, they would paſs into the ſtate of liquids. Now theſe liquids ſtill retain a great portion of caloric, which, inſtead of rendering their particles repulſive, does not hinder them from attracting each other. The ſame obſervation is ſtill more applicable were the ſpecific caloric of theſe liquids again ſo far diminiſhed, that they would paſs into the ſtate of ſolid bodies. Theſe ſolids would ſtill retain a portion of caloric, and yet their particles would attract each other with great force. That every degree of caloric, combined in bodies, tends to produce and increaſe, the elaſticity of their particles, ſeems not to be well founded, and Mr Dalton's method ſeems only calculated to aſcertain the quantity of caloric neceſſary to convert a body into its elaſtic ſtate.

(354.) But in a ſubject ſo very difficult and abſtruſe, although no ſatisfactory method of ſolving this queſtion has yet been deviſed, much may be expected from the perſeverence and known ſagacity of Mr Dalton.—Were we to venture an opinion we would expreſs our doubts whether there be any ſuch point as the abſolute zero of which philoſophers have been in queſt. As we conceived light to be matter reduced to extremely minute particles, and put into exceſſively rapid motion, ſo we conceive caloric to be matter whoſe particles are not ſo minute, nor its motions ſo rapid. We conceive that when this ſubſtance enters into chemical union with bodies, it ceaſes to be caloric, as an acid loſes its properties when combined with an alkali. When operated upon by cauſes which deſtroy this combination, it reſumes its motions, which are modified by its own elaſticity, and by its attraction for other bodies: but motion we reckon neceſſary to the conſtitution of caloric. It is only while in motion that, like light, it affects either our ſenſes, or the thermometer; and an enquiry concerning the true zero can only refer to that portion which is in motion, or which, by the operation of certain laws, can be rouſed from a combined into an active ſtate. Could we apply the proper means, we do not know how far we might go in eliciting caloric from bodies; and thus all calculations founded upon ſuch an imperfect knowledge of facts, muſt ever prove erroneous.—We proceed to the next branch of this enquiry.

III. *Of* COLD.

(355.) The term *Cold* is merely relative to our feelings. When we apply our hand to a body of a high temperature, caloric paſſes from the body into our hand, and we ſay the body feels hot. If the body be of a lower temperature than our hand, caloric paſſes from our hand into the body, and we ſay it feels cold. With one hand we may be made to feel the ſame body warm, and with the other, cold. Thus if one hand be kept in our boſom, at 80° or 90°, while the other is cooled in the open air to 50° or 40°; if we plunge the warm hand into water at 60° or 70°, or any intermediate point between the temperature of the two hands, we will pronounce the water cold: but if we plunge the cold hand into the ſame water, we will pronounce it warm. The only difference is that caloric paſſes from the one hand into the water, and from the water into the other hand. Thus we feel heat when caloric paſſes into our bodies, and cold when it paſſes from them. The intenſity of the ſenſation of heat, depends entirely on the exceſs of the temperature of the hot body, above that of our bodies, and on its conducting power: and the intenſity of the ſenſation of cold depends entirely upon the exceſs of the temperature of our bodies, above that of the cold body, and on the conducting power of the latter. In other words, the intenſity of each ſenſation depends entirely upon the rapidity with which caloric either enters, or quits our body.—Hence we can ſee the reaſon why a piece of iron, or marble, or other hard body, feels much warmer, or much colder, than a piece of cloth or other ſoft body, though both be of the ſame temperature. It is becauſe the iron and marble are better conductors of caloric than the cloth; and if their temperature be higher they impart heat to our body more rapidly than the cloth, and imbibe it more rapidly from our body, if their temperature be lower.

(356.) A queſtion has been agitated, whether cold be merely the abſtraction of caloric, or the abſence of heat, or whether cold be a poſitive ſomething, or body *ſui generis*. The latter opinion was maintaind by Muſchenbroeck and Mairan, and was generally received among philoſophers about the beginning of laſt century. They reckoned cold to be a ſaline ſubſtance, reſembling nitre, which floated in the air, in minute corpuſcles, to which they aſſigned the name of *frigorific particles*. They ſuppoſed a conſtant variance between the particles of heat and cold, and according as one or other prevailed, a body was rendered either warm or cold.

(357.) Dr Black having diſcovered that the freezing of water was not cauſed by the abſorption of any material ſubſtance, but by the evolution of *latent* or *combined* heat, the frigorific particles were baniſhed from the regions of chemiſtry.—The only fact that ſtill ſeems to ſupport the idea of cold being a material ſubſtance, is, that cold may be reflected in the ſame way as heat. Mr Pictet, Mr Leſlie, and others, have proved this by the moſt ſatisfactory experiments. If two concave tin mirrors, of the ſame focus, be placed at the diſtance of 10½ feet from each other a piece of ice, or glaſs matraſs full of ſnow, being put into the focus of the one mirror, will inſtantly cauſe a delicate air thermometer to ſink ſeveral degrees in the focus of the other mirror. The thermometer will again riſe if the ice or ſnow be removed from the other focus. If nitric acid be poured upon the ſnow (which increaſes the cold) the thermometer will ſink 5° or 6° lower, than when ſnow or ice alone are placed in the other focus. Here cold ſeems to paſs from the ſnow or ice to the mirror in whoſe focus it is placed; to be by it reflected to the oppoſite mirror; and by the latter to be condenſed into its own focus: all which could not happen, ſay ſome, unleſs cold were a material ſubſtance.

(358.) In order to account for this ſingular fact, Prevoſt, and Dr Hutton, call us to recollect that caloric is conſtantly radiated from all bodies, and that the temperature indicated by the thermometer is made up not only of the caloric reſident in the focal ball; but alſo of that which is radiated from ſurrounding bodies. As ice or ſnow radiate leſs than bodies of a higher temperature, they will not emit ſo much caloric to be reflected into the oppoſite focus, as would be emitted by a body of the ſame temperature with ſurrounding objects. The ſinking of the thermometer, then, in this caſe, does not mark cold reflected from the oppoſite focus; but a defect in the quantity of caloric which is neceſſary to be radiated, in order to keep up the equilibrium of temperature. A plauſible ſolution of the difficulty may alſo be obtained by ſuppoſing, that colder bodies abſorb the radiated heat of ſurrounding bodies, but radiate none: or at leaſt, that they abſorb much more vigorouſly than they radiate. If this be true, the current of radiated heat will be the reverſe in this caſe, of what it would be were a hot body placed in one of the foci of the mirrors. Inſtead of paſſing from the hot body to the mirror in whoſe focus it is placed, and being by it reflected to the oppoſite mirror, and ſo condenſed upon the focal ball: the focal ball itſelf is now the hot body; which having its caloric rapidly reflected upon, and abſorbed by the ice, is diminiſhed in temperature.

(359.) Mr Leſlie, if we admit his opinion that radiated heat is propagated by aerial pulſations, in the ſame manner, and with the ſame velocity as the propagation of ſound, explains this phenomenon in a very ſatisfactory manner.—His words (Inquiry into heat, p. 253) are as follows: "The ſame principle will likewiſe explain the diſperſion of cold. For the atmoſpheric particles that come in contact with a cold ſurface, muſt ſuffer a ſudden contraction, which will ſhoot its vibratory influence through the general maſs: and the cold wave thus excited will, in its ſpreading tremulous flight, ſtill retain the ſame diſtinctive character. Each of the minute parcels of air, as they ſucceſſively feel a contractile diſpoſition, will ſuffer a correſponding depreſſion of temperature, or will permit a certain part of their heat to eſcape. The heat ſo liberated, is again inſtantly abſorbed by the portion of air next behind, which, having contracted, is now recovering its tone. Though the motion of the aerial pulſes, therefore, is the ſame as in the former caſe, yet the direction of the ſubtle element of heat is exactly reverſed. Heat is, with the rapidity of ſound, conveyed from all quarters to the cold ſurface, as to a common centre."

(360.) It was formerly obſerved that when bodies paſs rapidly from a ſolid to a fluid ſtate, or from a fluid ſtate into that of elaſtic vapour, cold was generated: that is, the ſpecific caloric of the bodies is increaſed, that which was active being now combined, and no longer affecting the thermometer, or our ſenſes.

(361.) Upon the generation of cold by evaporation, are founded the methods by which the people in hot climates cool their liquors, and render them palatable. A caſk of water, or a flaggon of wine, is ſurrounded by thick porous cloth, and being ſuſpended from the yard-arm of a ſhip, is occaſionally moiſtened by being dipped in the ſea. The rapid evaporation of moiſture from the ſurface of the veſſel, renders the liquor within agreeably cool. This fact has been known to the Chineſe, and other eaſtern nations, from time immemorial. They place their cooling veſſels under a ſhade expoſed to a current of air, and are ſaid to produce ice in this manner, under the torrid zone. When the ſurface of the cooling veſſel is moiſtened with ſpirit of wine, ether, or any highly evapourable liquid, ice is produced with great facility. The Chineſe alſo uſe the ſolution of ſalammoniac for cooling their liquors, which, having the water evaporated, the ſalt is recovered in a ſolid form, ready for future uſe.

(362.) Farenheit was the firſt perſon who made experiments on freezing mixtures, and Mr Walker has given a more complete view of the ſubject in a paper publiſhed in the Philoſophical Tranſactions 1795. Profeſſor Lowitz diſcovered the great degree of cold produced by mixing muriate of lime with ſnow; and Mr Walker has lately reſumed the conſideration of the ſubject, and extended it by ſeveral new experiments.

(363.) As freezing mixtures are often neceſſary in chemical inveſtigations, in order to reduce the temperature of bodies, the reſult of theſe experiments is preſented in the following table: where the firſt column points out the proportions of the ſubſtances mixed; and the ſecond their effect in ſinking the thermometer.

TABLE OF *Freezing Mixtures.*

Mixtures.	Parts.	Thermometer ſinks
Muriate of ammonia Nitre . . . . . . Water	5 5 16	From 50° to 10°
Muriate of ammonia . Nitre . . . . . . Sulphate of ſoda . . Water	5 5 8 16	From 50° to 40°
Nitrate of ammonia . Water	1 1	From 50° to 40°
Nitrate of ammonia . Carbonate of ſoda . Water	1 1 1	From 50° to 70°
Sulphate of ſoda . . Diluted nitric acid .	3 2	From 50° to 3°
Sulphate of ſoda . . Muriate of ammonia . Nitre . . . . . Diluted nitric acid . .	6 4 2 4	From 50° to 10°
Sulphate of ſoda . . Nitrate of ammonia . Diluted nitric acid . .	6 5 4	From 50° to 14°
Phoſphate of ſoda . . Diluted nitric acid .	9 4	From 50° to 12°
Phoſphate of ſoda . . Nitrate of ammonia . Diluted nitric acid . .	9 6 4	From 50° to 21°
Sulphate of ſoda . . Muriatic acid . . .	8 5	From 50° to 0
Sulphate of ſoda . . Diluted ſulphuric acid	5 4	From 50° to 3°
Snow . . . . Common ſalt	1 1	From 32° to 0
Muriate of lime . . . Snow	3 2	From 32° to 50° below 0
Potaſh . . . . . . Snow	4 3	From 32° to 51° below 0
Snow . . . . Diluted ſulphuric acid	1 1	From 20° to 60° below 0.
Snow or pounded ice Common ſalt . . .	2 1	From 0 to —5°
Snow and diluted nitric acid		From 0 to —46°
Muriate of lime . . Snow	2 1	From 0 to —66°
Snow or pounded ice . Common ſalt . . . . Muriate of ammonia and nitre . . .	1 5 5	From —5° to —18°
Snow . . . . Diluted ſulphuric acid Diluted nitric acid .	2 1 1	From — 10° to — 56°
Snow or pounded ice Common ſalt . . . Nitrate of ammonia .	12 5 5	From — 18° to — 25°
Muriate of lime . . Snow	3 1	From —40° to —73°
Diluted ſulphuric acid Snow	10 8	From —68° to —91°

(364.) The ſalts employed in theſe experiments ſhould be freſh cryſtallized, and newly reduced to fine powder. The veſſels in which the mixtures are made, ſhould be very thin, and good conductors of caloric. Tin veſſels anſwer very well, and when acids are uſed, to prevent their action on the veſſels, they may be coated with wax. They ſhould be juſt large enough to hold the materials, which ſhould be mixed as rapidly as poſſible. To produce the deſired effect, the materials ſhould firſt be cooled down to the temperature marked in the table, by putting them into ſome other freezing mixture. If, for example, we wiſh to produce a cold equal to —46°, or 46° below 0, as in the 17th example in the table, we firſt cool down the ſnow and nitric acid to 0, by putting the veſſels containing them into the mixture of ſnow and ſalt mentioned in the example. Theſe materials are then mixed together, and produce the effect intended. The ſame may be obſerved of the mixtures in the lower part of the table, where ſeveral of the materials muſt previouſly be cooled, by other mixtures, conſiderably below 0, before their union will produce the effect intended. Thus by combining the effects of one mixture, with thoſe of others, we arrive at the greateſt artificial cold that has ever been produced, which is that expreſſed in the laſt example of the table, being 91° below 0, or 124° below the freezing temperature of water.

SECT. VIII. SOURCES *of* CALORIC.

(365.) HAVING already detailed what is known concerning the nature, properties, motions, and effects of this very curious ſubſtance; we come now to enumerate its ſources, and the means by which it is made ſenſible, and brought into action. Having anticipated much of this branch in former departments, we propoſe to be very ſhort in this, to avoid repetitions.—The ſources of caloric are,

1. The ſun.
2. Combuſtion.
3. Percuſſion.
4. Friction.
5. Mixture.

I. *The* SUN.

(366.) Aſtronomers have aſcertained the ſun to be an immenſe globe, 883,246 miles in diameter, and to contain about 333,928 times as much matter as our earth: and much more matter than all the comets, planets and ſattellites of our ſyſtem, though they were all concentrated into one maſs. From him light and heat are conſtantly radiated into ſurrounding ſpace: and as he is the center of gravity, he may be conſidered as the center of vitality to our ſyſtem. Philoſophers have hitherto aſcribed the light and heat which are darted from this immenſe globe, to a violent combuſtion which it was conſtantly undergoing. But the obſervations of Dr Herſchel render it more than probable that no ſuch combuſtion is going on. He aſcertained the ſun to be a ſolid opaque globe, ſimilar to our earth, and ſurrounded by an atmoſphere of great depth and denſity. In the lower parts of this atmoſphere, opaque clouds are ſeen, ſimilar to thoſe which form in our atmoſphere; but the higher regions of the ſun's atmoſphere are enveloped by luminous clouds, which emit the light to which his ſplendor is owing. Theſe luminous clouds are liable to various changes, both in quantity and luſtre; and hence Dr Herſchel thinks the quantity of light and heat emitted by the ſun varies in different ſeaſons; and to this he aſcribes the difference between the temperature of different years.

(367.) It has been already ſtated, from the experiments of Dr Herſchel and others, that the ſun darts forth three kinds of rays, namely, the *calorific*, the *colorific*, and the *deoxydiſing* rays. The firſt is the cauſe of *heat*, the ſecond of *colour*, and the third ſeparates *oxygen* from various bodies. It is with the *calorific* rays we have chiefly to do in this ſection; having treated of the others in their proper places.

(368.) The ſolar rays paſs through tranſparent bodies, and are reflected from poliſhed metallic ſurfaces, without leaving any ſenſible effect. But they are abſorbed by opaque bodies, and heat them in proportion to the darkneſs of their colour. Dr Hooke firſt made experiments on this effect of the ſun's rays, which were afterwards repeated and varied by Dr Franklin. The latter placed equal pieces of cloth, black, blue, red, white, upon the ſurface of the ſnow, expoſed to the ſun's rays, and found they ſank deeper, and conſequently imbibed heat, in proportion to the darkneſs of their colour. Mr Davy expoſed to light, one ſide of equal pieces of copper painted white, yellow, red, green, blue, and black. To the oppoſite ſide of each piece was attached a bit of cerate, whoſe melting point was 76°. The cerate on the blackened copper melted firſt, that on the blue next, then that on the green and red, next that on the yellow, and laſt of all, that on the white copper.—It ſeems to follow from hence, that thoſe ſurfaces which reflect light moſt powerfully, reflect alſo moſt caloric; and that thoſe ſurfaces, ſuch as black which abſorb moſt light, abſorb alſo moſt caloric. Hence, in place of white-waſhing the walls of hot-houſes, and thoſe on which fruit trees are faſtened, it has often been recommended to paint them black; that they may imbibe and afterwards give out, the greater quantity of heat.

(369.) Mr Thomas Wedgewood proved that black bodies abſorb, and retain both light and heat. Mr Cavallo and Mr Pictet obſerved that a thermometer whoſe bulb is blackened, ſtands higher than one whoſe bulb is clean, when expoſed to the light, either of the ſun, or of lamps, tho' they ſtand at the ſame point when placed in the dark. The latter alſo obſerved that the clean one falls faſter than the other, after they had been raiſed to a certain point: which ſeems contrary to Mr Leſlie's diſcovery of the great radiating power of blackened ſurfaces. But the effect muſt be aſcribed to the conducting power, and not to the radiating power, the former of which is ſtrongeſt in bright bodies, and the latter in thoſe which are black.

(370.) The temperature produced upon ſoils by the direct rays of the ſun, ſeldom exceeds 120°; though we have known dark vegetable loams, which had been well wrought and manured, conſiderably above this point, while the atmoſphere did not exceed 60°. At the ſame time wet grounds contiguous varied from 45° to 54°, which ſhews the great uſe of draining to enable the earth to imbibe caloric from the ſun, and to improve the climate.

(371.) To inveſtigate the degree of temperature which the ſun's rays might produce, Sauſſure made a ſmall box, lined with dry cork, the ſurface of which was charred to make it black and ſpongy, and render it a bad conductor. It was covered by a thin glaſs plate, through which the ſun's rays being admitted, a thermometer laid on its bottom ſoon roſe to 221° or 9° above the boiling point of water; while the atmoſphere was only 75°. The late Profeſſor Robiſon conſtructed a ſimilar apparatus, conſiſting of three very thin veſſels of flint glaſs, which tranſmits caloric better than any other ſpecies of glaſs. They were of the ſame ſhape, arched above, and placed over each other on a baſe of cork, prepared like that uſed by Sauſſure, having an interval of ½ inch between them. The apparatus reſted on down encloſed in a cylinder of paſteboard, that the caloric might be as little waſted as poſſible by the conducting power of bodies. When expoſed in a clear ſummer day, the thermometer roſe often to 230°, and once to 237°. When ſet before a bright fire, the thermometer roſe to 212°. Upon the ſame principle Dr Anderſon invented a hot-houſe, which produces a much higher temperature than is neceſſary for the growth of tropical plants, without the uſe of artificial heat. It conſiſts of a double frame of glaſs. The air between the frames not being allowed to ſhift, permits the radiated caloric of the ſolar rays to paſs into the interior, but being a bad conductor, prevents its eſcape by opening certain valves, the cold air is mixed with the hot, and the temperature regulated by a thermometer. Hence we can ſee the reaſon why animal bodies ſo ſoon ſhrivelled, and dried up, on the burning ſands of Arabia and Africa; and why certain ſpecies of food require no other cooking than to be covered with theſe ſands. Though we have no accurate thermometrical obſervations of the temperature of theſe places, it muſt be very great, as the ſolar rays fall moſtly perpendicular upon the torrid zone, and muſt impart much more caloric than in our climate, where they always fall obliquely. Were the caloric, as formerly obſerved, not carried from thoſe places by the air, it is hard to ſay how far it might accumulate. When the ſun's rays are concentrated by means of a burning glaſs, or reflected from a parabolic ſpeculum, they produce as high, if not a higher degree of temperature, than any we can produce by the beſt conſtructed furnaces. But to produce the effect, they muſt be thrown upon a body capable of retaining them; for when thrown upon a tranſparent body, ſuch as water or air, they paſs through without any ſenſible effect.

(372.) It was formerly ſuppoſed that light and caloric were repellents of each other; and that when the ſun's rays made a body hot, the light being abſorbed by the body, cauſed it to throw out its caloric. On the other hand, that the accumulation of caloric in a body, repelled its light, as iron becomes luminous after it is heated to a certain point. Now it is known that light and caloric are combined in the ſolar rays; that they are both abſorbed by bodies of dark coloured ſurfaces; and that they are both reflected from the ſame ſurfaces; and differently refracted by the ſame tranſparent media.—Whether the caloric of the ſolar rays be a combination of light with atmoſpheric matter, was a queſtion hinted at formerly. Being leſs refracted than light, its particles ſeem to be denſer, and hence poſſeſs a greater momentum. When caloric is conducted thro' bodies, the colour or ſhape of their ſurfaces occaſions no difference. In being *conducted* by and *expanding* all bodies, and carried by fluids, caloric differs from light, which is never ſenſible except when it moves in right lines.

II. COMBUSTION.

(373.) No phenomenon in nature is more wonderful in itſelf, more ſurpriſing, or attended with more beneficial effects in chemiſtry and the arts, and in promoting the comfort and conveniency of human life, than combuſtion. Without the application of this phenomenon, a great part of our globe muſt have remained uninhabitable; arts and ſciences never could have been invented: and man muſt have remained a naked ſavage, more miſerable, and more helpleſs, than the beaſts of prey. But a phenomenon which we ſee every day ſoon ceaſes to excite our ſurpriſe, and we never accuſtom ourſelves to think of the magnitude and importance of its multifarious effects.—It is not, however, ſurpriſing that philoſophers, and eſpecially chemiſts, ever ſince men began to make uſe of their reaſon when they viewed natural phenomena, have conſidered combuſtion to be of the firſt importance, and the inveſtigation of its cauſe, and mode of operating, to be the foundation of true chemical ſcience.

(374.) When we heat a ſtone, or brick, to a certain degree, they become luminous; but if they be withdrawn from the fire, they ſoon cool, and return to their former ſtate, without any ſenſible change. But if we heat a piece of wood, or charcoal to about 800°, in the open air, the caſe is very different. They kindle, and become much hotter of themſelves. They throw out light and caloric with great violence for ſome time; until the effect begins gradually to diminiſh, and at laſt ceaſes entirely. We now find that theſe bodies have undergone a complete change: that the greateſt part of their ſubſtance has been diſſipated in the air, and there is nothing left of them but a ſmall reſiduum, which is not capable of undergoing combuſtion.—This phenomenon early ſuggeſted a diſcrimination, or claſſification of bodies into *combuſtible*, and *incombuſtible*.

(375. The firſt attempts to account for combuſtion were extremely crude, and founded on a fancied analogy between this proceſs and eating. As animals convert part of their food into their own ſubſtance, ſo they ſuppoſed that fire eat up, or devoured the combuſtible, and converted it into its own ſubſtance. The aſhes that were left were ſuppoſed not to be a proper food for fire, and therefore they were left untouched.—The Poets who perpetuate all the firſt rude approaches toward ſcience, ſtill talk of *devouring flames*.

(376.) As long ago as 1665, the celebrated Dr Hooke in his *Micrographia*, propoſed a theory of combuſtion, which may be conſidered as the foundation of the one now generally received. According to him, there exiſts in common air a ſubſtance, which is ſimilar to, if not the very ſame with that which is fixed in ſaltpetre. This ſubſtance poſſeſſes the property of diſſolving all combuſtibles; but only when they are conſiderably heated. The ſolution takes place with ſuch rapidity as to produce heat and light; which he reckoned mere motions. The diſſolved ſubſtance remains partly in the ſtate of air; and is partly in a liquid or ſolid form. He ſuppoſed that a given bulk of air contained much leſs of this ſolvent, than the ſame bulk of ſaltpetre; and hence a combuſtible will not burn nearly ſo long in a limited bulk of air, as in ſaltpetre. He ſuppoſed the ſolvent was ſoon ſaturated unleſs the air was conſtantly changed: and hence he accounted for the acceleration of the proceſs when the air was forced in upon the combuſtible by bellows.

(377.) About ten years afterwards, his theory was adopted, without acknowlegement, by Mayow in a tract upon ſaltpetre, publiſhed at Oxford. He made many fanciful and extravagant additions to Dr Hooke's theory; but at the ſame time confirmed it by ſeveral ingenious experiments, in which he anticipated ſome of our modern chemical diſcoveries. To the ſolvent of Hooke he gave the name of *ſpiritus nitro-aërius*, and ſuppoſed it to conſiſt of very minute particles, which are conſtantly at war with the particles of combuſtibles; and from their quarrels all the changes produced by combuſtion are effected. He ſuppoſed fire, or light, to be theſe particles in very rapid motion, and heat to be the ſame particles in leſs rapid motion. That the ſun conſiſts of nitro-aerial particles, which move with great rapidity, and fill all ſpace. That their motion is retarded as they recede from the ſun; and when they approach the earth, they become pointed, and conſtitute *cold*. Notwithſtanding the glaring abſurdity of many of his opinions and reaſonings, he firſt pointed out the cauſe of the increaſe of weight in metals when calcined; aſcertained the changes produced upon air by reſpiration and combuſtion; and employed an apparatus ſimilar to the pneumatic apparatus of our modern chemiſts.

(378.) The attention of chemiſts was ſoon drawn away from the theory of Hooke to that which was firſt propoſed by Becher, but was afterwards methodized and illuſtrated ſo much by Stahl, as to paſs under the name of the Stahlian theory of combuſtion.

(379.) He aſcribed combuſtion, not to the action of any aërial ſubſtance on the combuſtible body, but to a ſubſtance to which he gave the name of PHLOGISTON, combined with the combuſtible body. He ſuppoſed phlogiſton to be invariably the ſame in all bodies, and that combuſtibles derived their diſcriminating properties, from the various materials which entered into their compoſition, along with phlogiſton. He ſuppoſed phlogiſton to be liable to a ſtrange whirling, and other unaccountable motions; and that the light and heat emitted during combuſtion, are only the phlogiſton in this violent ſtate of agitation.

(380.) The celebrated Macquer who firſt reduced chemiſtry to a regular ſyſtem, and added ſeveral new branches which were unknown before his time; while he illuminated the whole with that perſpicuous and accurate reaſoning by which he was ſo much diſtinguiſhed: being at the head of the moſt ſplendid eſtabliſhment in Europe for the cultivation of chemical ſcience, added a celebrity and faſcination to the phlogiſtic theory which it had not attained before. To doubt, or queſtion the truth of this theory, was long reckoned a ſort of chemical hereſy, or even blaſphemy, throughout Europe. But Macquer ſaw defects in the hypotheſis of Stahl. Sir Iſaac Newton had proved light to be a body; and Macquer conſidered phlogiſton to be nothing elſe but light fixed in bodies. According to his improvements on the ſyſtem, phlogiſton is a peculiar matter, extremely ſubtile, very elaſtic, capable of penetrating the denſeſt bodies, and the cauſe of heat, light, magnetiſm, electricity, of corpuſcular attraction, and even of gravitation. It was ſuppoſed to be the ſame with the other of Hooke and Newton, and to exiſt in a fixed ſtate in combuſtible bodies. When ſet at liberty, it gives to caloric and light their peculiar motions; and hence heat and light accompany every proceſs of combuſtion. When bodies, after combuſtion, become heavier than they were before, this was what might naturally be expected from having the phlogiſton expelled from them; which being the cauſe of gravitation in other bodies, is itſelf endowed with a principle of levity, or repulſion from the centre of the earth. Though, in certain caſes, it could penetrate the denſeſt bodies; there were other caſes, when, to explain a phenomenon, it was ſuppoſed incapable of penetrating veſſels as open as a ſieve.

(381.) When the phlogiſtic theory was reduced to this enlarged and improved ſtate, Dr Prieſtly was employed in extending the boundaries of pneumatic chemiſtry. He repeated the experiments on combuſtion formerly made by Hooke, Mayow, Boyle, Hales, and others; and added ſo many new and ſtriking ones of his own, that he may juſtly be ſaid to have laid open a new world for the inveſtigation of chemiſts. He found that combuſtibles only burned a certain time in a given quantity of air, after which they were extinguiſhed; and that combuſtibles could no longer burn in this air, nor could animals breathe in it without ſuffocation. He accounted for the fact by ſuppoſing that the air had combined with the phlogiſton of the burning body, and that combuſtion conſiſted in the act of combining phlogiſton with air.—Still the heat and light, emitted during the proceſs, remained unaccounted for; as, if the phlogiſton combined with air, it could neither be heat nor light, nor could its ſeparation from the combuſtible put theſe fluids in motion.

(382.) Dr Crauford attempted to ſolve this difficulty by applying to combuſtion Dr Black's doctrine of latent heat. He ſuppoſed that while the phlogiſton combined with air, it precipitated, or threw out of combination the heat and light, which were previouſly in union with it. According to him, therefore, the heat and light were *latent*, or in chemical union with air, and are rendered active, or ſenſible, by the combination with phlogiſton; juſt as magneſia is thrown out of combination with an acid by the addition of an alkaline ſalt.—This opinion was, at leaſt, ſupported by more plauſible analogies than any of the former.—But ſtill they were at a loſs to decide what phlogiſton is, which produced ſuch wonderful effects.

(383.) Mr Scheele, from a great variety of moſt ingenious and very elaborate experiments, ſeems to conclude that hydrogen, or the gas which enters into the compoſition of water, is phlogiſton. Inſtead of concluding, with Macquer, that light, or caloric, were phlogiſton, and that they reſided in the combuſtible body, he ſuppoſed that light and caloric were compounds, formed by the union of various proportions of oxygen, with hydrogen, or phlogiſton; and that the formation of light and caloric took place during the act of combuſtion.

(384.) Mr Kirwan, whoſe chemical reſearches are entitled to the higheſt praiſe, having endeavoured to prove that hydrogen exiſts as a component part of every combuſtible body, in an *Eſſay on Phlogiſton and the Conſtitution of Acids*, endeavoured to prove that hydrogen and phlogiſton were the ſame.—But neither he nor Mr Scheele ſeem to have adverted, that if hydrogen be phlogiſton, its combination with oxygen ſhould produce water. In the combuſtion of hydrogen with oxygen, no other product but water can be obtained; and the light and caloric which are evolved, are common to the combuſtion of other ſubſtances as well as of hydrogen.

(385.) While theſe improvements and modifications of the phlogiſtic theory were going on, the illuſtrious Lavoiſier was intent on a laborious and ingeniouſly varied courſe of experiments on combuſtion: and aided by all the lights which the experiments of others, joined to his own obſervation, could throw upon the ſubject, he arrived at this general law of Nature.—*That in every caſe of combuſtion, oxygen combines with the burning body.*—This grand diſcovery, the fruit of acute genius, of patient induſtry, and of profound ſagacity, may be regarded as of the ſame importance in Chemiſtry as Sir Iſaac Newton's diſcovery of the law of gravitation in Mechanics, and the ſyſtem of the univerſe. It has diſpelled the miſt thrown upon chemiſtry by phlogiſton; has connected and explained a vaſt number of facts formerly in apparent contradiction to each other, and inexplicable; and has infuſed into the whole that ſimplicity and connection which ever diſtinguiſh a true ſcience.

(386.) Such, however, was the ſuperſtitious attachment to phlogiſton, that after Lavoiſier had publiſhed his diſcoveries, with his proofs, diſtinguiſhed as he was by his fortune, his rank, and his talents, it was very long before he made a ſingle convert to his doctrine. Berthollet, at the Academy of Sciences 1785, was the firſt who declared in its favour. He was ſoon followed by Fourcroy, profeſſor of chemiſtry in Paris, and in 1787, by Morveau. The example of theſe leading men ſoon produced the general reception of his doctrine in France. In this country it had to contend with a whole hoſt of prejudice; but it forced its way by the evidence of its truth; and is now univerſally received over Europe. This diſcovery is not propoſed as a theory, but announced as a fact, of the truth of which any one may ſatisfy himſelf. Had the French Revolution produced no other miſchief but the deſtruction of that great and good man, it would have merited the indignation and reſiſtance of the human race.

(387.) Lavoiſier having proved that oxygen combines with the combuſtible ſubſtance, in all caſes of combuſtion, reſtored the explanation of this phenomenon which had formerly been offered by Hooke; but with much more preciſion, and ſtrength of evidence. To account for the light and heat which are emitted during combuſtion, he adopted Dr Crauford's accommodation of Dr Black's theory of latent heat, and ſuppoſed the light and heat to be chemically combined with oxygen, in its gaſeous ſtate, and to be thrown out of combination when the oxygen united with a combuſtible body. We have already hinted our doubts if this be a true explanation of the matter, and are rather inclined to think that light and caloric no longer exiſt as peculiar bodies, when they become latent, or enter into chemical combination; and that the light and heat emitted by combuſtion are only ſmall particles of matter put in motion by the violent colliſion between the particles of oxygen and of the combuſtible body. But as we may have an opportunity of conſidering this point more fully afterwards, a hint is ſufficient at preſent.

(388.) Thus, then, according to Lavoiſier, combuſtion conſiſts in two things—the decompoſition of oxygen—and the union of its baſe with the combuſtible body. He ſuppoſed oxygen in its gaſeous ſtate to have light and caloric in chemical union with it, and that this light and caloric were thrown out, and reſumed their active ſtate while the oxygen combined with the combuſtible body. The compound formed by the union of oxygen with a combuſtible body, is incombuſtible, becauſe, being already ſaturated with oxygen, it can abſorb no more: and combuſtion conſiſts in the act of combining oxygen with the combuſtible body.

(389.) This explanation is applicable to all the caſes which are uſually eſteemed combuſtion, when light and caloric are extricated while oxygen combines with a body. But oxygen often combines with bodies, ſuch as muriatic acid, azote, mercury, &c. when no ſenſible extrication of heat or light can be perceived. Lavoiſier's followers confounded all ſuch proceſſes under the general name of *combustion*; but they ought rather to be diſtinguiſhed by the name of *oxygenizement*, and the term *combustion* appropriated to thoſe caſes where light, or caloric, or both of theſe ſubſtances are extricated during the combination of oxygen with bodies.

(390.) We hinted that that part of Dr Crauford's theory which is brought to aſſiſt in the explanation of combuſtion, does not ſeem to be well founded. It aſſumes that oxygen owes its gaſeous form to light and caloric in chemical union with it; and that when the oxygen enters into a more denſe combination, it throws out this light and caloric. There are caſes of as violent combuſtion when the oxygen is preſented to the combuſtible in a liquid or ſolid form, as when it is preſented in the form of a gas. Now, by the theory, the oxygen could not have entered into a liquid or ſolid combination, without giving out the whole, or greateſt part of its combined light and caloric; and yet we ſee it ſtill gives out theſe as copiouſly, as if it had been preſented to the combuſtible in its gaſeous ſtate: or the ſtate in which it is ſuppoſed to contain the greateſt poſſible proportion of light and caloric.

(391.) Thus if nitric acid, eſpecially if it has a very minute mixture of ſulphuric acid, be poured upon linſeed oil, or oil of turpentine, a very violent combuſtion takes place, with a very copious emiſſion of light and caloric. Here the oxygen in the compoſition of the nitric acid, is not only in a liquid form; but by its previous union with azote it had undergone what the French chemiſts call a combuſtion, with ſenſible emiſſion of caloric. Yet we find that, according to this theory, it ſtill continues to diſcharge light and caloric very copiouſly. This is in direct oppoſition to the theory, which ſuppoſes that after oxygen is changed by combuſtion, it can no longer emit light or caloric.

(392.) Gunpowder is compoſed of nitre, charcoal, and ſulphur, and it burns with great violence even under an exhauſted receiver. The nitre ſupplies the oxygen for the combuſtion of the other two ingredients; and, in this caſe, the oxygen is part of a ſolid body. Yet, when inflamed, much light and caloric are emitted, and the products of this combuſtion are gaſeous bodies. Theſe, by the theory, ſhould have fixed a very great portion of light and caloric in their compoſition when they aſſumed the elaſtic form; and yet we ſee, that inſtead of fixing, they actually throw out a great quantity of light and caloric. Thus, oxygen in its ſolid ſtate is made to contain a much greater quantity of light and caloric in its compoſition, than the elaſtic gaſes which are formed by its union with the other ingredients: a ſuppoſition in expreſs contradiction to the theory.

(393.) Mr Brugnatelli, profeſſor of chemiſtry at Pavia, has endeavoured to obviate this objection by ſuppoſing that oxygen combines with bodies in two ſtates. In the firſt of theſe ſtates he ſuppoſes it ſtill retains the whole, or greateſt part of the light and caloric which entered into its compoſition in its gaſeous form; and hence it diſcharges them when preſented to bodies capable of decompoſing it. In the ſecond ſtate it diſcharges the whole, or greateſt part of its light and caloric while entering into combination with bodies. Of the firſt ſtate of combination, we have an example of oxygen in the compoſition of nitre, which ſtill retains the whole, or greateſt part of its light and caloric. In this ſtate he thinks it enters into the compoſition of ſeveral gaſeous bodies, of liquid and ſolid bodies. He thinks alſo it combines with metals in this ſtate; and he diſtinguiſhes this ſtate of oxygen by the name of *thermoxygen*. Of the ſecond we have an example in the union of oxygen with charcoal, with ſulphur, and with all thoſe bodies where the product is an acid. In ſuch caſes he thinks the oxygen parts with the whole, or greateſt part of its combined light and caloric, and while it is in this combination he diſtinguiſhes it by the ſimple name of oxygen.

(394.) This theory can only be conſidered as a convenient mode of accounting for the light and caloric emitted during combuſtion; for no proof is offered to eſtabliſh its truth. The example we adduced of gun-powder forming gaſeous products by its exploſion, ſeems to prove that the theory of Dr Black is miſapplied when brought to account for the light and heat of combuſtion; becauſe, by his theory, the exploſion of gun-powder ſhould produce *cold*, or the abſorption and combination of active caloric with the gaſes formed. It may be more prudent for us to leave the difficulty in the ſtate we found it; or if conjectures be admiſſible, we would have recourſe to the one we have ſo often hinted at. That motion is eſſential to the exiſtence of light and caloric; and that when they enter into the compoſition of bodies, their motion ceaſes, or they are no longer either light or caloric. That theſe ſubſtances are impelled, and reſume their peculiar motions in conſequence of the violent colliſion which takes place in certain chemical and mechanical proceſſes; and eſpecially when oxygen combines with a combuſtible body. If this ſuppoſition have any foundation, we need not ſearch for light and caloric either in the oxygen, or in the combuſtible body; but in matter put in motion by the colliſion of both ſubſtances.

(395.) Dr Thomſon is of opinion that the caloric is combined with the oxygen, or ſupporter of combuſtion, and the light with the combuſtible body, or ſubject of combuſtion. He appeals to the example of plants, which do not become combuſtible unleſs light be admitted to them. The quantity of light emitted during combuſtion, he alſo alledges to correſpond with the quantity previouſly fixed in the combuſtible body. Thus hydrogen, when inflamed with oxygen in the formation of water, produces a very great heat, but a very faint light; becauſe much oxygen enters into the compoſition of water, and throws out its caloric; while the proportion of light in the compoſition of hydrogen is very ſmall. Charcoal emits more light than hydrogen, and phoſphorus moſt of any; while they do not combine with ſo great a proportion of oxygen as enters into the compoſition of water; and hence there is not ſo much caloric emitted during their combuſtion.

(396.) Dr Thomſon therefore explains combuſtion by ſuppoſing that the combuſtible body has light united with its baſe; while the oxygen, or ſupporter of combuſtion, has caloric. During the proceſs, the two baſes of the combuſtible and ſupporter unite with each other, forming an incombuſtible product; while the caloric of the ſupporter unites with the light of the combuſtible, and they eſcape in the form of fire. The Dr acknowledges that this explanation is liable to many objections; and he propoſes it with all that modeſty and diffidence which ever diſtinguiſh true ſcience.

(397.) It may only be neceſſary to add farther on this ſubject, that all bodies are divided into *ſupporters* of combuſtion; into *combuſtible* and *incombuſtible*, and *products* of combuſtion. The *ſupporters* of combuſtion are either *ſimple* or *compound*. There is only one ſimple ſupporter of combuſtion known, namely *Oxygen gas*, which is not entitled to this character, if, as ſtated by Lavoiſier, it be compounded of light and caloric with an aërial baſis; or with Dr Thomſon, it be compounded of caloric and ſome unknown matter. All the known ſupporters follow, and they are all compounded with oxygen gas.

1. Oxygen gas;
2. Atmoſpheric air;
3. Nitrous oxide;
4. Nitric oxide (*nitrous gas*;)
5. Nitric acid;
6. Oxymuriatic acid;
7. Hyperoxymuriatic acid.

(398.) *Combuſtible* bodies are of three kinds, namely ſimple, compound, and oxides. But as we ſhall have occaſion to treat of them more fully afterwards; it is ſufficient ſimply to hint at their diviſions at preſent.

(399.) The *products* of combuſtion are compound bodies formed by the union of oxygen with the combuſtible body: or, according to Lavoiſier and Dr Thomſon, the *products* are formed by the union of the *baſes* of the *ſupporters* and of the *combuſtible* bodies. The products of combuſtion are always either 1. Water; 2. An acid; or 3. A metallic oxide.

(400.) Some products of combuſtion, and eſpecially metallic oxides, are capable of combining with an additional doze of oxygen. But this additional combination is not attended with the uſual phenomena of combuſtion, namely the emiſſion of light and caloric; and metallic oxides are thus rendered *partial ſupporters* of combuſtion: that is, they part with this exceſs of oxygen to ſupport the combuſtion of other bodies. Theſe *partial* ſupporters are,

1. Peroxide of gold;
2. Peroxide of ſilver;
3. Red oxide of mercury;
4. Peroxide of mercury;
5. Peroxide of iron;
6. Red and brown oxides of lead;
7. Peroxide of manganeſe.

Thus there is, in fact, only one known ſupporter of combuſtion, namely oxygen; which operates when applied in its uncombined ſtate, or when in union with certain bodies; and partially when united in exceſs with certain other bodies, particularly with ſome metallic oxides.

III. Percussion.

(401.) The third ſource of caloric mentioned at the beginning of this Section is Percuſion. Every one knows that when a flint and a piece of ſteel are ſtruck againſt each other, ſparks are produced, and particles of the ſteel are torn off which are found to be liquified by exceſſive heat. We mentioned that every ſmith can kindle his fire by ſmartly hammering a ſoft pieee of iron. We formerly attempted to account for the caloric evolved in this caſe, upon Dr Irvine's principle of compreſſion, or condenſation of the material. The ſpecific gravity of iron before hammering is 7·788; but after hammering it is 7·840. Platinum before hammering is 19·50; after it is 23·00.

(402.) Percuſſion excites no heat in liquids, or in ſoft bodies which yield to the ſtroke; apparently becauſe it produces no permanent condenſation of their particles. We had formerly occaſion to ſtate condenſation as one cauſe of ſeparating caloric from bodies, and may now add an example or two by way of farther illuſtration.—When muriatic gas combines with water, the temperature riſes 100°: when ammoniacal gas combines with the ſame muriatic acid gas, forming a ſolid ſalt, the temperature riſes ſtill higher. Heat is produced when ſulphuric acid combines with limeſtone, notwithſtanding the eſcape of carbonic acid gas, which combines with, and carries off much of the caloric: but when ſulphuric acid combines with pure lime the heat approaches to redneſs. In theſe caſes the compound is either a liquid or a ſolid, which occupy much leſs ſpace than the volume of the ingredients when ſeparate.

(403.) Mr Dalton has alſo aſcertained that if air be ſuddenly condenſed to half its bulk, its temperature riſes 50°, and it ſinks 50° if the receiver be rarefied in the ſame proportion. The condenſation is produced by percuſſion, or mechanical compreſſion. It would ſeem that a much higher temperature is produced by the condenſation of air, if what Mollet ſtates be well founded, that a rag of linen, rolled up, takes fire if put in the ſmall canal of the pump, which conducts the condenſed air into the condenſing receiver.

(404.) When ſparks are forced from ſteel by a flint, the heat is increaſed by the combination of the particles of ſteel with oxygen; tho' the firſt commencement of the heat be owing to the compreſſion of the particles of the ſteel by percuſſion. The ſame obſervation is applicable to all caſes of caloric being evolved by the percuſſion of combuſtible bodies. All theſe are caſes of real combuſtion, or of the combination of oxygen with a combuſtible baſis.—But how ſhall we account for the light and caloric evolved by the percuſſion of two incombuſtible bodies, ſuch as quartz, flint, fellſpar, and other hard bodies? Mr T. Wedgewood, by holding a piece of glaſs to a revolving wheel of grit, made it red hot at the point of contact, ſo that it emitted particles which ſet fire to gun-powder, and to hydrogen gas.—We apprehend no ſolution of this difficulty can be offered but the one we formerly attempted.—That light and caloric are only minute particles of matter put in motion by percuſſion, or by the colliſion which takes place during certain chemical combinations.

IV. Friction.

(405.) It has been ſeen that percuſſion operates chiefly in exciting caloric, by condenſing bodies, and diminiſhing their ſpecific caloric. But friction has no ſuch effect upon bodies; and the caſes of hard incombuſtible bodies being made to emit caloric by percuſſion, were rather examples of friction than of the former; becauſe the caloric is excited here without any apparent condenſation of the bodies, or diminution of their ſpecific caloric.

(406.) Every one knows that ſavages are in the conſtant practice of kindling their fires by rubbing two dried ſticks together. The Indian Bramins kindle the fires for their ſacred rites, by means of a log of ſandal wood, in which a hole is bored, and a wooden pin is twirled round in the hole by means of a cord coiled round it. By the rapid motion the pin ſoon takes fire, and kindles the fuel. Cart wheels, and the rubbing machinery of mills are very apt to take fire, if they be not lubricated with oil, or ſome ſubſtance which may diminiſhed the friction, while it carries off the caloric that is generated.—When combuſtible bodies are expoſed to friction, their temperature firſt riſes to the point of ignition; and then caloric is evolved by combuſtion, or the combination of oxygen with the combuſtible body.

(407.) But when two pieces of quartz, or other hard incombuſtible bodies, are rubbed together, they may be made to become red hot; and yet no emiſſion of caloric by combuſtion takes place, becauſe there is no ſenſible combination of oxygen with the bodies.—To aſcertain this point, Mr Pictet contrived a machine to produce friction in the exhauſted receiver of an air-pump; and found the friction not only excited heat, but alſo a phoſphoreſcent light which was viſible in the dark, where no combination of oxygen could take place.

(408.) Count Rumford, by employing the machinery uſed in the boring of cannon, excited very high degrees of temperature, ſo much, that a braſs cylinder while boring with a ſteel auger, being ſurrounded with a wooden veſſel filled with water, in two hours and 30 minutes, the water actually boiled. The borer was preſſed againſt the bottom of the hole in the cylinder with a force equal to 10'000lbs. avoirdupois, and was turned round at the rate of 32 times in a minute.

(409.) The caloric evolved in theſe caſes of the friction of incombuſtible bodies againſt each other, can neither be accounted for from the compreſſion of their parts, as in ſome caſes of percuſſion, by which they are made to part with their ſpecific caloric: nor can it be accounted for from the combination of oxygen with the bodies; becauſe it takes place in vacuo where there is no oxygen to combine.

(410.) Dr Thomſon endeavours to account for the phenomena by ſuppoſing caloric to be nearly allied to electricity; and thinks it may be accumulated in bodies by friction in the ſame way as the latter.—But we reckon electricity itſelf to be a ſubtile elaſtic fluid which becomes ignited in conſequence of friction, and combination with atmoſpheric oxygen; in the ſame way as phoſphorus. When electricity is made to paſs thro' oxygen gas confined in a glaſs tube, it emits a much more vivid light, and a far more intenſe heat, than when it paſſes thro' atmoſpheric air; and in this reſpect it exhibits a ſtriking analogy with all other combuſtible bodies. When it paſſes thro' a metallic wire which is inſufficient to conduct it freely, it melts, or diſſipates the wire in vapour: but if the wire be large enough to conduct the quantity that paſſes, with eaſe, no ſenſible effect enſues. The firſt is a caſe of friction between the electric fluid and the wire, where the electric fluid meeting with much reſiſtance from the inſufficiency of the conductor, much of it paſſes along the ſurface, and excites caloric by friction both on the metal and on the incumbent atmoſphere. When the metallic conductor is ſufficient to diſcharge the whole quantity with eaſe, no ſuch friction takes place, and the wire is not ſenſibly heated. We are therefore under a neceſſity of reverting to the opinion ſo often hinted at, that light and caloric are only particles of matter put in motion by certain proceſſes.

V. Mixture.

(411.) In the IIId. Diviſion of Section VII. we preſented numerous examples of bodies, when mixed together, producing cold. We have alſo frequently hinted at mixtures which produce heat, or an emiſſion of caloric; and hinted alſo at the late Dr Irvine's explanation of theſe phenomena, namely, That when bodies paſſed from a ſolid to a fluid ſtate, or from a fluid to a gaſeous ſtate, cold is produced, or their ſpecific caloric is increaſed. The ſame effect happens when bodies are expanded into a larger volume, without any change of form. On the other hand when bodies paſs from a gaſeous to a fluid, or from a fluid to a ſolid ſtate, heat is produced, or their ſpecific caloric is diminiſhed. This alſo happens when the bodies are reduced to a ſmaller bulk, whether by mechanical compreſſion, or chemical mixture.

(412.) In moſt of the caſes referred to, water is preſent, and much of the effect may be aſcribed to changes in the ſtate of this ſubſtance. Thus when ſalt and ſnow are mixed, both the bodies paſs from a ſolid to a liquid ſtate, and great cold is produced: but when water combines with quicklime, the *water* only paſſes into a ſtony or ſolid ſtate, and a red heat enſues. So far from the lime ſuffering a diminution of bulk, it expands, to between 3 and 4 times its former ſize; which by all received theories, ſhould generate cold, or increaſe the ſpecific caloric.—We ſuſpect this fact muſt baffle all the theories concerning ſpecific heat, and can only be accounted for upon the principles we have endeavoured to ſuggeſt; namely the violent colliſion between the particles of the materials during mixture. When only the water paſſes into the ſolid form, all the caloric evolved, according to received theories ought to come from it, and muſt have been ſpecific, or in chemical union with the water previous to its change of form. This will increaſe the ſpecific caloric of water to an extraordinary degree, ſo as to overturn all received ſyſtems.

(413.) When alcohol combines with water, heat is evolved, and ſtill more when ſulphuric acid combines with water; becauſe in theſe caſes the ſum of the bulks of the bodies when ſeparate, is very much diminiſhed. But when ſulphuric acid combines with pure potaſh, or ſoda, or with quicklime, no ſuch diminution of bulk can be perceived, and yet a much higher temperature than in any of the former caſes, is produced. It is true that in the laſt caſe, the ſulphuric acid changes its ſtate, from a liquid to a ſolid body: but no received theory will account for the exceſſive evolution of caloric, unleſs we ſuppoſe it to be produced by ſome ſuch cauſes as percuſſion or friction, which detach a greater quantity of caloric from the bodies, than can be aſcertained to be ſpecific or combined with them.

(414.) We therefore think ourſelves warranted to conclude that neither light nor caloric are primary, or elementary bodies; becauſe no explanation of their phenomena, founded on this ſuppoſition, is ſufficient to account for the facts.

(415.) Having thus endeavoured to preſent an outline of what is known concerning theſe two moſt curious and important ſubſtances, light and caloric, we have only to regret that our knowledge concerning them is, in many important particulars, ſo very limited. Much has been lately diſcovered, and much ſtill remains to crown the future labours of genius and perſeverance. In a ſubject ſo very intricate and difficult miſtakes are unavoidable, and, it is hoped, will meet with candid indulgence.

PART. II.

On CHEMICAL INSTRUMENTS.

(416.) It is not intended to enter into a deſcription of all the machines, or inſtruments, that are uſed in chemical inveſtigations, becauſe theſe are ſo multifarious that a ſhort deſcription of them might fill a volume. Every ingenious chemiſt varies the conſtruction of his inſtruments according to the object he has in view; and contrives new ones when new paths of the ſcience are to be explored. A ſhort deſcription of thoſe inſtruments which are in moſt common uſe, may ſuffice to ſuggeſt the idea of ſuch as may be afterwards needed.

Sect. I. *Of the* Means *uſed to* overcome *the* Attraction *or* Adheſion *between the* Particles *of* Bodies.

(417.) As the law of affinities tends continually to bring the particles of bodies into contact, and to maintain them in a ſtate of union, almoſt all the efforts of the chemiſt are directed to overcome this attractive power. The means he employs may be reduced to three claſſes; viz. 1. the diviſion of bodies by mechanical operations; 2. the diviſion or ſeparation of their particles from each other by ſolvents; and 3. by preſenting to the ſeveral principles of the ſame bodies, ſubſtances which have a ſtronger affinity to them than thoſe principles have to each other.

(418.) The different operations performed upon bodies by the chemiſt, to determine their nature, alter their form, their texture, and even in ſome inſtances change their conſtitution, are either *mechanical* or *chemical*. The *mechanical* operations which are neceſſary to be deſcribed here, do not change the nature of ſubſtances; but in general change only their form and bulk. Theſe operations are performed by the hammer, the knife, the peſtle, &c. in mortars of ſtone, of glaſs, or of metal; and it is the nature of the ſubſtance under examination which determines the uſe of one or other of theſe veſſels. The object of theſe preliminary operations is, to prepare and diſpoſe bodies for new operations which may diſunite their principles and change their nature: theſe laſt mentioned operations, which may be diſtinguiſhed by the appellation *Chemical*, are what moſt eſſentially conſtitute the analyſis.

(419.) The SOLUTION, to which we are now to attend, conſiſts in the diviſion and diſappearance of a ſolid in a liquid, but without any alteration in the nature of the body ſo diſſolved. The liquid in which the ſolid diſappears, is called the *ſolvent* or *menſtruum*. The agent of ſolution appears to follow certain conſtant laws. It does not appear to differ from that of affinity; at leaſt in all caſes the ſolution is more or leſs abundant, in proportion to the affinity of the integrant parts of the ſolvent to thoſe of the body to be diſſolved. From this principle it follows, that, to facilitate ſolution, bodies ſhould be triturated and divided, as by theſe means a greater number of ſurfaces are preſented, and the affinity of the integrant parts is diſtinguiſhed.

(420.) It ſometimes happens that the affinity between the ſolvent and the body preſented to it has ſo little energy, that it does not become perceptible till after a conſiderable interval of time. Theſe ſlow operations, of which we have ſome examples in our laboratories, are common in the works of nature; and it is probably to ſimilar cauſes that we ought to refer moſt of thoſe reſults, whoſe cauſes or agents eſcape our obſervation and perception. The operation of ſolution is more ſpeedy in proportion as the body to be diſſolved preſents a greater ſurface: on this principle is founded the practice of pounding, triturating, and dividing bodies intended to be diſſolved.

(421.) The ſolution of a body conſtantly produces cold; and advantage has been taken of this phenomenon to procure artificial cold, much ſuperior to the moſt rigorous temperature ever obſerved in our climates. The principal ſolvents employed in our operations are water, alcohol, and fire. Bodies ſubmitted to one or the other of theſe ſolvents preſent ſimilar phenomena; they are divided, rarefied, and at laſt diſappear: the moſt refractory metal melts, is diſſipated in vapour, and paſſes to the ſtate of gas, if a very ſtrong heat be applied to it. This laſt ſtate therefore forms a complete ſolution of the metallic ſubſtance in the caloric. The effect of caloric is often united with one of the other ſolvents to accompliſh a more ſpeedy and abundant ſolution. But theſe three ſolvents do not exerciſe an equal action on all bodies indiſcriminately.

(422.) The moſt of authors who have treated of ſolution have conſidered it in too mechanical a point of view. Some have ſuppoſed ſheaths in the ſolvent and points in the body diſſolved, to account for the want of increaſe in the bulk of water, in proportion to the quantity of ſalt it takes up. But the Bp. of Landaff has concluded from his numerous experiments, that the water riſes in the veſſel at the moment of the immerſion of the ſalt; that it falls during the ſolution; and that after the ſolution it riſes above the original level. The two laſt effects appear to M. Chaptal to depend upon the change of temperature which the liquor undergoes. The refrigeration ariſing from the ſolution muſt diminiſh the volume of the ſolvent; but it ought to return to its firſt ſtate as ſoon as the diſſolution is finiſhed. The peculiar affinities of bodies to each other are various; therefore the conſtituent principles may be eaſily diſengaged by other ſubſtances; and upon this, the action of all the re-agents employed by chemiſtry in its analyſis is founded. Sometimes the chemiſt diſplaces certain principles, which he can in that ſtate examine more accurately, becauſe inſulated, and diſengaged from all their combinations; and it frequently happens that the re-agent made uſe of combines with ſome principle of the body analyſed; and a compound ariſes, whoſe characters indicate the nature of the principle which has thus entered into combination, as the combinations of the principal re-agents with various baſes are well known. It ſometimes alſo happens that the re-agent is itſelf decompoſed, which circumſtance renders the phenomena and the products more complicated; but from the nature of theſe products, a judgment of the component parts of the body analyſed may generally be formed.

Sect. II. *Of the* Apparatus, *or* Instruments *employed in* Chemistry.

(423.) As the whole of the practical part of this ſcience conſiſts in placing bodies in contact with each other, in ſuch a manner that they may exert their reſpective attractions, or powers of combination, without intermixture or diſturbance of other bodies not deſigned to enter the propoſed experiments, and in raiſing or lowering the temperature of ſuch bodies under examination, it is obvious that the degree of ſucceſs, attending ſuch reſearches, muſt depend in a great meaſure upon the inſtruments or apparatus made uſe of; and alſo that a great number of the terms uſed in chemiſtry will be either deſcriptive of theſe inſtruments, or of the operations performed with them.

(424.) Among the inſtruments employed in chemiſtry, there are ſome which are of general uſe, and applicable to moſt operations; and others which ſerve only for peculiar purpoſes. At preſent we need only to treat of the former. The others may be deſcribed on ſuch occaſions as render it neceſſary to conſider their uſes. The chemical inſtruments moſt frequently employed are Furnaces. Theſe conſiſt of earthen veſſels appropriated to the various operations performed upon bodies by means of fire. A proper mixture of ſand and clay is commonly the material of which theſe veſſels are formed. But it is difficult, and even impoſſible, to preſcribe and determine, according to any invariable method, the proportions of theſe conſtituent parts; becauſe they muſt be varied according to the nature of the earths made uſe of. The different methods of applying fire to ſubſtances under examination, have occaſioned the conſtruction of furnaces in different forms: all of which may be here reduced to the following kinds.

(425.) I. The evaporatory furnace, ſo named from its uſe, is employed to reduce liquid ſubſtances into vapour by heat, in order to ſeparate the fixed principles from thoſe which are more ponderous, and which were mixed, ſuſpended, compounded, or diſſolved in the fluid. The fire-place is covered by the evaporatory veſſel; and 2 or 3 groves, channels, or depreſſions, are made in the ſides of the furnace, near its upper edge, to facilitate the drawing of the fire.

(426.) The veſſel which contains the ſubſtance to be evaporated, is called the Evaporatory vessel. Veſſels of this kind are generally formed of earth, glaſs, or metal. Thoſe made of unglazed earth are too porous, inſomuch that liquids filtrate through their texture. Thoſe of porcelain biſcuit are likewiſe penetrable by liquids ſtrongly heated, and ſuffer gaſeous or aeriform ſubſtances to eſcape. The beautiful experiments of M. D'Arcet upon the combuſtion and deſtruction of the diamond, in balls of porcelain, ſerve to illuſtrate this ſubject. M. Chaptal has alſo confirmed his reſults by experiments in the large way, upon the diſtillation of aqua fortis, which loſes as well in quality as quantity, when the proceſs is carried on in veſſels of porcelain clay. Glazed earthen veſſels cannot be uſed when the glazing conſiſts of the oxides or calces of lead or copper, as thoſe metallic matters are attacked by acids, fats, oils, &c. Neither can earthen veſſels be employed which are covered with enamel, becauſe this kind of opaque glaſs is almoſt always full of ſmall cracks, through which the liquid would introduce itſelf into the body of the veſſel. Earthen veſſels cannot therefore be properly made uſe of; excepting in operations of little delicacy, in which preciſion and accuracy are not indiſpenſably neceſſary.

(427.) Evaporatory veſſels of glaſs are in general to be preferred. Thoſe which reſiſt the fire better than any others are prepared in the laboratory, by cutting a ſphere of glaſs or a receiver into two equal parts by a red-hot iron; as the capſules which are made in the glaſs-houſe are thickeſt at the bottom, and conſequently liable to break at that part when expoſed to the fire. In manufactories evaporatory veſſels of metal are commonly made uſe of, and copper is moſt generally employed, becauſe it not only poſſeſſes the property of reſiſting fire, but has a conſiderable degree of ſolidity, together with a facility of being wrought. Alembics are made of this metal, for the diſtillation of vinous ſpirits, and aromatic ſubſtances; and alſo caldrons or pots for the cryſtallization of certain ſalts, and for ſeveral dyeing proceſſes, &c. Lead is likewiſe of conſiderable uſe, and ſhould be made choice of whenever operations are to be performed on ſubſtances which contain the ſulphuric acid, ſuch as the ſulphates of alumine and of iron; and for the concentration and rectification of the *oils of vitriol*. Tin veſſels are alſo employed in ſome operations; the ſcarlet both affords a more beautiful colour in boilers of this metal than in thoſe of any other. Capitals of tin have already begun to be ſubſtituted in the room of thoſe of copper, in the conſtruction of alembics; and thus the ſeveral products of diſtillation are exempted from every ſuſpicion of that dangerous metal. Boilers of iron are likewiſe uſed for certain coarſe operations; as, in the concentration of the lixivia of common ſalt, of nitre, &c. In ſome delicate operations evaporatory veſſels of gold, ſilver, or platina, are to be preferred; but the price of theſe veſſels does not permit them to be uſed, eſpecially in the large way. It is however from the nature of the ſubſtance to be evaporated, that the choice of the veſſel moſt ſuitable to any operation muſt be determined. There is no particular kind of veſſel which can be employed excluſively on all occaſions; but glaſs preſents the greateſt number of advantages, as it is compoſed of a ſubſtance the leaſt attacked, the leaſt ſoluble, and the leaſt deſtructible by chemical agents.

(428.) The veſſels employed in evaporation are known by the names of *capſules*, *cucurbits*, &c. according to their different forms. Theſe veſſels ought in general to be very wide and ſhallow, that the diſtillation and evaporation may be ſpeedy and œconomical. It is neceſſary that the evaporatory veſſel be not narrower at its upper part, that the heat be applied to the liquid in all parts, and equally; and that the column or maſs of the liquid ſhould have little depth, and a large ſurface of evaporation. Upon theſe principles Profeſſor Chaptal has conſtructed boilers for diſtilling brandy, which ſave eleven twelfths of the time, and four fifths of the combuſtible materials.

(429.) EVAPORATION may be performed in three different ways. 1. By a naked fire. ii. By the ſand bath. iii. By the water bath. Evaporation is made by a NAKED FIRE, when there is no ſubſtance interpoſed between the fire and the veſſel which contains the liquid intended to be evaporated; as, when water is boiled in a pot.

(430.) It is performed by the SAND BATH, when a veſſel filled with ſand is interpoſed between the fire and the evaporatory veſſel. The heat in this caſe is communicated more ſlowly and gradually; and the veſſels, which would otherwiſe have been broken by the immediate application of the heat, are enabled to reſiſt its force. At the ſame time the heat is more equally kept up; the refrigeration is more gradual; and the operations are performed with a greater degree of order, preciſion, and facility.

(431.) If a veſſel of water be made uſe of, and the evaporatory veſſel be plunged in the liquid, the evaporation is ſaid to be made on the WATER BATH: in this caſe, the ſubſtance to be evaporated is only heated by communication from the water. This method of evaporation is employed when certain principles of great volatility, ſuch as alcohol, or the aromatic principles of plants, are to be extracted or diſtilled. It poſſeſſes the advantage of affording products which are not changed by the fire, becauſe the heat is tranſmitted to them by the intervention of a liquid: it is this circumſtance which renders the proceſs valuable for the extraction of volatile oils, perfumes, ethereal liquids, &c. It has alſo the advantage of affording a heat nearly equal, becauſe the degree of ebullition is a term nearly conſtant, and this ſtandard heat may be graduated or varied at pleaſure, by adding ſalts to the liquid of the water bath, as this ſingle circumſtance renders the ebullition more or leſs quick and eaſy. The ſame effect may likewiſe be produced by reſtraining the evaporation; for in this caſe the liquid may aſſume a degree of heat much more conſiderable, as is ſeen in the digeſter of Papin, ſteam engines, eolipiles, and the boilers for ſtriking the red tinge in cotton, &c.

(432.) SUBLIMATION evidently differs from evaporation, becauſe the ſubſtance to be raiſed is ſolid. The veſſels uſed in this operation are known by the name of *ſublimatory veſſels*. Theſe are commonly globes terminating in a long neck; which are then called *mattraſſes*. In order to ſublime any ſubſtance, a part of the ball of the mattraſs is ſurrounded with ſand. The matter which is volatilized by the heat ariſes, and is condenſed againſt the coldeſt part of the veſſel; where it forms a ſtratum or cake, that may be taken out by breaking the veſſel itſelf. In this manner, ſal ammoniac, corroſive ſublimate, and other ſimilar products,

CALORIMETER.

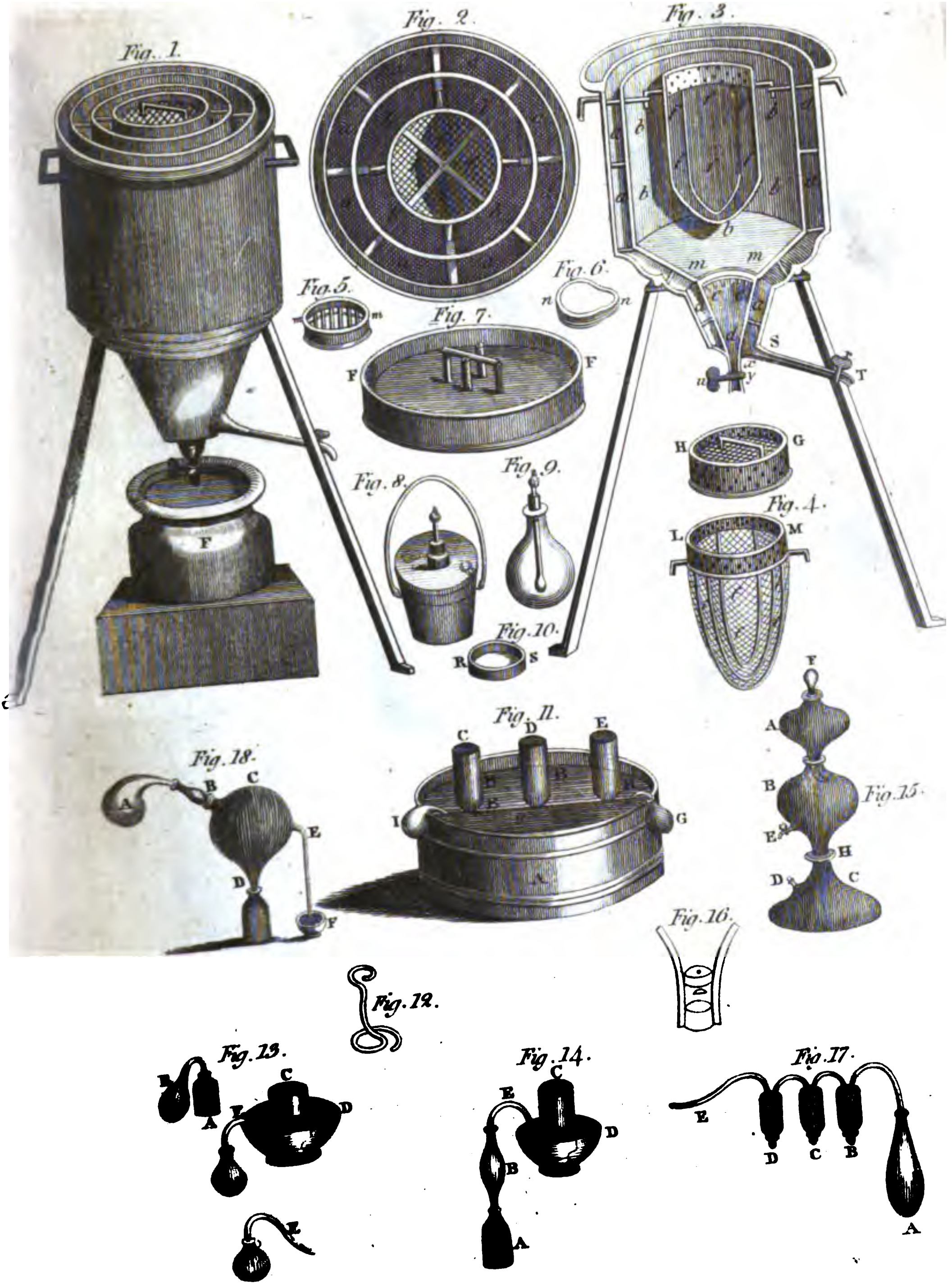


Fig. 1.

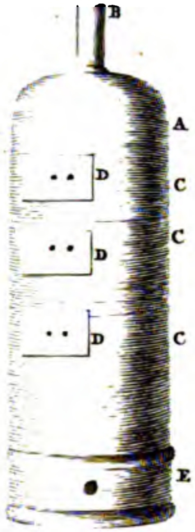


Fig. 2.

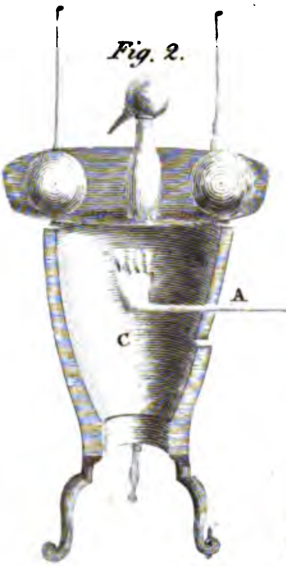


Fig. 3.

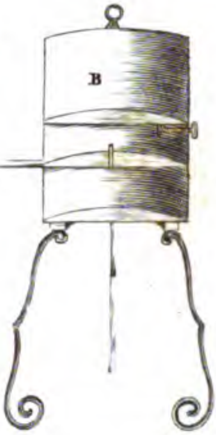


Fig. 9.

Fig. 8.

Fig. 4.

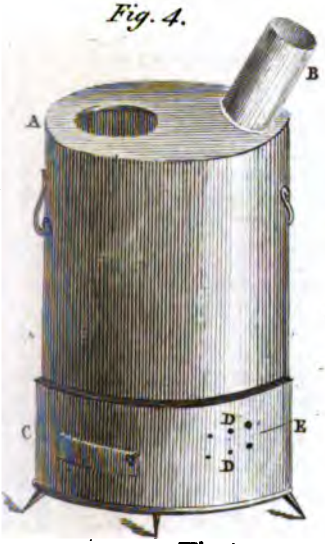


Fig. 6.

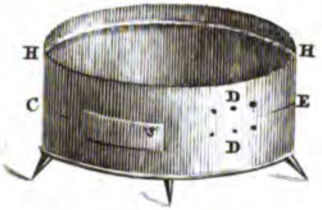


Fig. 5.

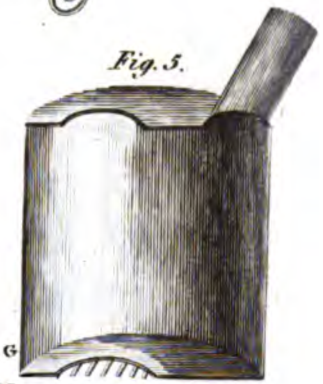
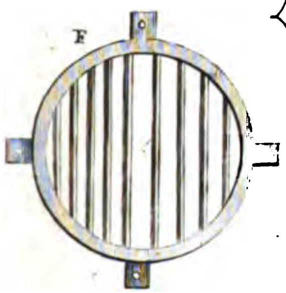


Fig. 7.



CHIMES.

The Notes of the 100 Psalm Tune.

Fig. 10.

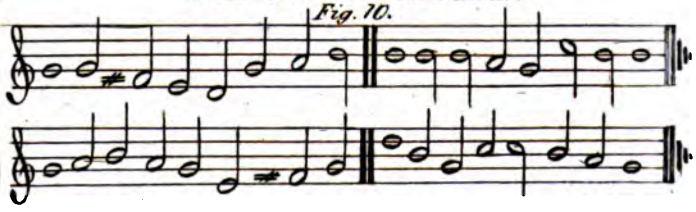
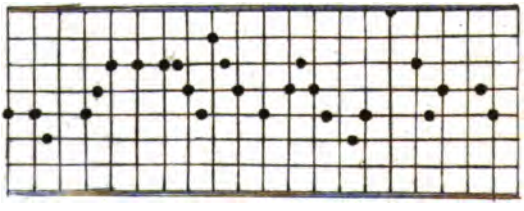


Fig. 11.

A Table for dividing the Chime Barrel of the 100 Psalm tune.



products, are formed for the purpoſes of commerce. This operation is uſually performed either for the purpoſe of purifying certain ſubſtances, and diſengaging them from extraneous matters; or elſe to reduce into vapour, and combine under that form, principles which would have united with great difficulty if they had not been brought to that ſtate of extreme diviſion.

(433.) II. The REVERBERATORY FURNACE, is that conſtruction which is appropriated to diſtillation. It is compoſed of 4 parts; viz. 1. The aſh-hole, intended for the free paſſage of the air, and to receive the aſhes or reſidue of the combuſtion. 2. The fire-place, ſeparated from the aſh-hole by the grate, in which the combuſtible matter is contained. 3. A portion of a cylinder, which is called the laboratory, becauſe it is this part which receives the retorts employed in the operations or diſtillations. 4. Theſe pieces are covered with a dome, or portion of a ſphere, pierced near its upper part by an aperture, which affords a free paſſage to the current of air, and forms a chimney.

(434.) The moſt uſual form of the reverberatory furnace is that of a cylinder terminated by a hemiſphere, out of which ariſes a chimney of a greater or leſs length, to produce a ſuitable degree of circulation of the air. That the furnace may be well proportioned, the aſh-hole ſhould be large, to admit the air freſh and unaltered; and the fire-place and laboratory together ſhould have the form of a true ellipſis, whoſe two foci ſhould be occupied by the fire and the retort. In this caſe all the heat, whether direct or reflected, will ſtrike the retort. The reverberatory furnace is uſed for diſtillation, which is that proceſs by which the force of fire is applied to diſunite and ſeparate the ſeveral principles of bodies, according to the laws of their volatility, and their ſeveral affinities.

(435.) The veſſels uſed for this purpoſe are named RETORTS. They are formed of glaſs, ſtone ware, porcelain, or metal; theſe ſubſtances being reſpectively uſed, according to the nature of the bodies intended to be expoſed to diſtillation. But whatever be the nature of the material, the form of the retort is the ſame; it reſembles an egg, terminating in a beak or tube, which diminiſhes inſenſibly in diameter, and is ſlightly inclined or bended. The oval portion of the retort, which is called its belly, is placed in the laboratory of the furnace, and is ſupported upon two bars of iron, which ſeparate the laboratory from the fire-place; while the beak or neck of the retort iſſues out of the furnace through a circular aperture formed in the edges of the dome and of the laboratory.

(436.) The RECIPIENT, or *receiver*, is a veſſel intended to receive the product of the diſtillation, and is fitted to the neck of the retort. It is commonly a ſphere with two apertures; the one of conſiderable magnitude, to receive the neck of the retort; the other ſmaller, to afford vent for the vapours. This part is called the *tubulure* of the receiver; whence the terms *tubulated* receiver, or receiver *not tubulated*.

(437.) Though the reverberatory furnace be particularly adapted to diſtillation, this operation may be performed on the ſand bath; and here, as in other caſes, it depends on the ingenuity of the artiſt to vary his apparatus according to the neceſſity of circumſtances, and the nature of the ſubſtances upon which he operates. The conſtruction of theſe furnaces may likewiſe be varied; and the chemiſt will find it neceſſary to learn the art of availing himſelf of every apparatus he may poſſeſs to carry his various operations into execution.

(438.) III. The FORGE FURNACE is that in which the current of air is determined by bellows. The aſh-hole, the fire-place, and the laboratory are here all united together; and this aſſemblage forms only a portion of a cylinder, pierced near the lower angle by a ſmall hole, into which the tube of the bellows enters. This part is ſometimes covered with a hemiſphere or dome to concentrate the heat with greater efficacy, and to reflect it upon the bodies expoſed to it. The forge furnace is employed in the fuſion and calcination of metals, and generally for all the operations which are performed in crucibles.

(439.) IV. To avoid the trouble and expence of a number of furnaces, a PORTABLE one hath long been a deſideratum among chemiſts who are fond of making experiments. One of the beſt of thoſe, if not the very beſt, that hath yet appeared, is that deſcribed in Shaw's edition of Boerhaave's chemiſtry, and repreſented *fig.* 1. *Plate* 69. This furnace is made of earth; and as the workmanſhip of a furnace requires none of the neatneſs or elegance which is required in making potters veſſels, any perſon may eaſily make a furnace of this kind for himſelf, who has as much time and patience. The walls ſhould be every where ſix inches thick at leaſt; and the form cylindrical as in the plate. It ſhould conſiſt of 5 or more parts. A repreſents the dome, or top of the furnace; B a ſhort earthen funnel for carrying off the ſmoke; C, C, C, are moveable earthen cylinders, each provided with a door D, D, D. Theſe doors have each two holes in the middle, into which an iron fork may be introduced to take off occaſionally. Within the lowermoſt cylinder is placed an iron grate a little below the door, to ſupport the fire. In the under part is a ſmall hole, E. to admit the pipe of a pair of perpetual bellows. Dr Lewis prefers the organ bellows. Each cylinder ſhould have in its upper part a round hole oppoſite to its door for carrying off the ſmoke; and another on the ſide for giving a paſſage to the neck of a retort when neceſſary. Theſe holes may be filled with ſtopples made of the ſame materials with the furnace, when the retort is not uſed. In Boerhaave's Chemiſtry iron plates are recommended to ſtrengthen the furnace; but this is not neceſſary if the walls are of the above thickneſs. By having more holes for bellows, this furnace may be heated to a moſt intenſe degree.

(440.) V. Dr BLACK has contrived a furnace in which all the conveniences of moſt others are avoided. See *Plate* LXIX. *fig.* 4, 5, 6. Two thick iron plates, above and below, are joined by a thinner plate, forming the body of the furnace, which is of an oval form. The upper part is perforated with two holes; the one, A, pretty large, which is the mouth of the furnace, and which is of a circular form; and the other behind it, B. of an oval form, and deſigned for faſtening the end of the vent which is ſcrewed down upon it. The undermoſt thick plate has only one large circular opening G, near to the middle, but not altogether ſo, being nearer to one ſide of the ellipſe than the other, where the round hole in the top is placed; ſo that a line paſſing this circular hole has a little obliquity forwards. The aſh-pit H H *Fig.* 6. is likewiſe made of an elliptical form, and a little widened; ſo that the bottom of the furnace is received within the ellipſe. A little below, there is a border C E that receives the bottom of the furnace; and except the holes of the damping-plate D D, the parts are all cloſed by means of ſoft lute, upon which the body of the furnace is preſſed down; by which means the joining of the two parts, and of all the different pieces, are made quite tight; for the body, fire-place, aſh-pit, vent, and grate, are all ſeparable from one another. As the furnace comes from the workman, the grate F, *Fig.* 7. is made to apply to the outſide of the lower part. It conſiſts of a ring laid on its edge, and bars likewiſe laid on their edges; and from the outer ring proceed 4 pieces of iron, by means of which it may be ſcrewed down; ſo that it is kept out of the cavity of the furnace, and preſerved from the extremity of the heat. Thus it laſts much longer, and is indeed hardly liable to any decay; for by being expoſed to the air, it is kept ſo cool, that it is never hurt by the heat of the fuel. The ſides, which are made of plate iron, muſt be luted within, to confine the heat, and preſerve them from its action.

(441.) To adapt this to the various operations of chemiſtry, we may obſerve, that for a melting furnace it is very convenient; we need only provide a cover for the opening above, which is made the door; and which, being immediately over the grate, is convenient for introducing the ſubſtances to be acted upon, and for allowing us to look into the veſſel and take it out. This cover may be a piece of tile, or two bricks rendered flat and ſquare. Dr Black commonly uſes a kind of lid with a rim containing a quantity of lute: and to augment the heat, we may increaſe the height of the vent. It can be employed in moſt operations in the way of eſſaying; and the ſituation of the door allows us to ſee the ſubſtances very readily. It does not admit the introduction of the muffle; but can be employed in all thoſe operations where the muffle is made uſe of; and in Cornwall in England ſuch a furnace is made uſe of for eſſaying of metals. To preſerve the ſubſtance from the contact of the fuel, they cut off about a third part of the length of a brick, and then put it on one end in the middle of the grate. They chooſe their fuel of large pieces, that the air may have free paſſage through it, and open a little of the door, which occaſions a ſtream of air to flow in; and this ſtrikes upon the ſubſtance and produces the effect deſired; ſo that it may be uſed in the calcination of lead to convert it into litharge. It alſo anſwers very well in operations for producing vapour.

(442.) To employ it in diſtillations which require an intenſe heat, the earthen retort is to be ſuſpended by means of an iron ring having three branches ſtanding up from it, *fig.* 8. and which hangs down about half a foot from the hole; ſo that the bottom of the retort reſts upon the ring, and is immediately hung over the fuel; and the opening between the mouth of the furnace and retort is filled up with broken crucibles and potſherds, which are covered over with aſhes that tranſmit the heat very ſlowly; ſo it anſwers for diſtillations performed with the naked fire. Dr Black has ſometimes cauſed them to be provided with a hole in the ſide, from which the neck of the retort may be made to come out; and in this way has diſtilled the phoſphorus of urine, which requires a very ſtrong heat. For diſtillations with retorts performed with the ſand bath, there is an iron pot, *fig.* 9. fitted for the opening of the furnace, which is ſet on and employed as a ſand pot. The vent of the furnace then becomes the door; and it anſwers very well for that purpoſe; and is more eaſily kept tight than if it were in the ſide, and may be kept cloſe with a lid of charcoal and clay. In like manner it anſwers well for the common ſtill, which may be adapted to it; part of it being made to enter the open part of the furnace, and hung over the fire; and the vent becomes the door, by which freſh fuel may be added. Indeed it is ſeldom neceſſary to add freſh fuel during any operation. In the ordinary diſtillations it is never neceſſary; and even in diſtilling mercury, phoſphorus, &c. it generally contains enough to finiſh the operation; ſo effectually is the heat preſerved from loſs or diſſipation, and ſo very ſlow is the conſumption of the fuel. For luting this and other furnaces, the doctor finds nothing preferable to a ſimple mixture of ſand and clay. The proportions for ſtanding the violence of fire are four parts of ſand to four of clay) but when deſigned for lining the furnaces, he uſes 6 or 7 of ſand to one of clay. The ſand ſettles into leſs bulk when wet, and does not contract by heat, which it alſo reſiſts as well as the clay itſelf. Beſides this outſide lining next the fire, Dr Black uſes another to be laid on next the iron of the furnace; and this conſiſts of clay mixed with a large proportion of charcoal duſt. It is more fit for containing the heat, and is put next the iron, to the thickneſs of an inch and a half. That it may be pretty dry when firſt put in, he takes 3 parts by weight of the charcoal duſt, and one of the common clay, which muſt be mixed together when in dry powder, otherwiſe it is very difficult to mix them perfectly. As much water is added as will form the matter into balls; and theſe are beat very firm and compact by a hammer upon the inſide of the furnace. This luting, after being dried and gradually heated, acquires a degree of hardneſs equal to that of free ſtone, and proves very laſting.

(443.) Crucibles are veſſels of earth or metal, which are almoſt always of the form of an inverted cone. A crucible ought to ſupport the ſtrongeſt heat without melting: it ought to reſiſt the attacks of all ſuch agents as are expoſed to heat in veſſels of this kind. The moſt perfect are made in Heſſe and Holland. Prof. Chaptal has made very good ones by a mixture of raw and unbaked clay from Salavas in the Vivarais. Laboratories have lately been provided with crucibles of platina, which unite the moſt excellent properties. They are nearly infuſible, and at the ſame time indeſtructible by fire. The different earthen crucibles may be fabricated by the hand, or wrought in the lathe. The firſt proceeding renders them more ſolid, the clay is better united, and it is the only method uſed in glaſs manufactories; but the ſecond method is more expeditious.

(444.) The AGENT of ſuch decompoſitions, as are effected by means of furnaces, is FIRE. It is afforded by the combuſtion of wood, pit coal, or charcoal. Wood is employed in certain large works; but charcoal is preferable in our laboratories, becauſe it does not ſmoke, has no bad ſmell, and burns better in ſmall maſſes than other combuſtibles. That which is the moſt ſonorous, the drieſt, and the leaſt porous is to be choſen.

(445.) In ſeveral operations, it is neceſſary to defend the retorts from the immediate action of the fire, and alſo to reſtrain the expanſive vapours, which are very elaſtic, and frequently corroſive. To anſwer theſe purpoſes various LUTES have been employed. A glaſs retort expoſed to the action of the fire would break, if the operator was not to have recourſe to the precaution of coating it with earth. For this purpoſe M. Chaptal has found it advantageous to uſe a mixture of fat earth and freſh horſe dung. The fat earth is ſuffered to rot for ſome hours in water; and when it is moiſtened, and properly ſoftened, it is to be kneaded with the horſe dung, and formed into a ſoft paſte, which is to be applied and ſpread with the hand upon every part of the retort intended to be expoſed to the action of the fire. The horſe dung combines ſeveral advantages It contains a ſerous fluid, which hardens by heat, and ſtrongly connects all the parts together; (but when this juice has been altered by fermentation or age, the dung does not poſſeſs the ſame virtue,) and the filaments or ſtalks of hay, which are ſo eaſily diſtinguiſhed in horſe dung, unite all the parts of the lute together. Retorts luted in this manner reſiſt the impreſſion of the fire very well; and the adheſion of the lute to the retort is ſuch, that even ſhould the retort fly during the operation, the diſtillation may ſtill be carried on.

(446.) To coerce or oppoſe the eſcape of the vapours which are diſengaged during any operation, it is ſufficient if the joinings of the veſſels be covered with paper glued on, or with ſlips of bladder moiſtened with the lute of lime and white of egg, provided the vapours be neither dangerous nor corroſive; but when they are, it is neceſſary to uſe the *fat lute* to retain them. This lute is uſed with boiled linſeed oil, mixed and well incorporated with ſifted clay. Nut oil, kneaded with the ſame clay, forms a lute poſſeſſing the ſame properties. It is eaſily extended in the hand, and is uſed for defending the joinings of veſſels, upon which it is afterwards ſecured by ſtrips of linen, dipped in the lute of lime, and white of egg. But previous to the application of heat in any diſtillation, it is neceſſary to ſuffer the lutes to dry. Without this precaution, the vapours would either riſe and eſcape, or combine with the water which moiſtens the lutes, and thus corrode and deſtroy the bladder, the ſkin, the paper, and in ſhort every ſubſtance uſed to ſecure them. The lute of lime and white of egg dries very ſpeedily, and muſt be uſed the moment it is made. This lute likewiſe oppoſes the greateſt reſiſtance to the eſcape of the vapours, and adheres the moſt intimately to the glaſs. It is prepared by mixing a ſmall quantity of finely powdered quick lime with white of egg, and afterwards beating up the mixture to facilitate the combination. It is then to be inſtantly applied on pieces of old linen, wrapped round the joinings. But in large works, where it is not poſſible to attend to all theſe minutiæ, the joinings of the retort and receiver are luted together with the ſame lute which is uſed to coat the retorts. A covering of the thickneſs of a few lines is ſufficient to prevent the vapours of the marine or nitrous acid from eſcaping.

(447.) But in certain operations a diſengagement takes place of ſuch a prodigious quantity of vapours, that it is dangerous to confine them; yet the ſuffering them to eſcape would occaſion a conſiderable loſs in the product; therefore an apparatus has been contrived of great ingenuity and ſimplicity to moderate the iſſue, and to retain without riſk ſuch vapours as would otherwiſe eſcape. This apparatus is named after its author, Mr WOULFE; and his excellent proceſs conſiſts in adapting the extremity of a recurved cube to the tubulure of the receiver; the other end of which is plunged into water, in a bottle half filled, and properly placed for that purpoſe. From the empty part of this bottle iſſues a ſecond tube, which is plunged in the water of a 2d bottle. A number of other bottles may be added, obſerving the ſame precautions; taking care to leave the laſt open, to give a free eſcape to the vapours which are not coercible: and, when the apparatus is thus diſpoſed, all the joinings are to be luted. The vapours, which eſcape from the retort, paſs through the tube adapted to the tubulure of the receiver, and conſequently muſt paſs through the water of the firſt bottle: they therefore ſuffer a firſt reſiſtance, which partly condenſes them. But as almoſt all vapours are more or leſs miſcible and ſoluble in water, a calculation is previouſly made of the quantity of water neceſſary to abſorb the vapours diſengaged from the mixture in the retort; and care is taken to diſtribute this quantity in the bottles of the apparatus. See *Pl.* 68. *fig.* 18. & § 478.

(448.) Thus the pureſt and moſt concentrated products may be obtained; as the water, which is always the receiver and the vehicle of theſe ſubſtances, becomes ſaturated with them. There is probably no other method of obtaining products always of an equal energy, and comparable in their effects; a circumſtance of the greateſt importance in the operations of the arts, as well as in philoſophical experiments. This apparatus has been applied to works in the large way. It has been uſed to extract the common muriatic acid, the oxigenated muriatic acid, ammoniac or volatile alkali, &c. As in this apparatus it might very often happen, that the preſſure of the external air would cauſe the water of the outer veſſels to paſs into the receiver, in conſequence of the ſimple refrigeration of the retort; this inconvenience has been obviated, by inſerting a ſtraight tube into the necks of the firſt and the ſecond bottles, to ſuch a depth, that its lower end is plunged into the water, while its other end riſes ſeveral inches above the neck of the bottle. When, therefore, the dilated vapours of the receiver and retort are condenſed by cooling, the external air will ruſh through theſe tubes to eſtabliſh the equilibrium; and the water cannot paſs from the one to the other.

(449.) Before the invention of this apparatus, it was uſual to drill a hole in the receiver, which was kept cloſed, and only opened from time to time for the eſcape of the vapours. But this method was inconvenient in many reſpects. In the firſt place, in ſpite of all precautions, it was attended with the riſk of an exploſion every moment, by the irregular diſengagement of the vapours, and the impoſſibility of calculating the quantity produced in a given time. A 2d inconvenience was, that the vapours which thus eſcaped occaſioned a conſiderable loſs in the product, and even weakened the remainder; becauſe this volatile principle conſiſted of the ſtrongeſt part. A 3d inconvenience was, that the vapours which eſcaped incommoded the artiſt to a very great degree. It is therefore evident, that Woulfe's apparatus unites a number of advantages; ſuch, for inſtance, as economy in the proceſſes, ſuperiority in the product, and ſafety to the operator; and the inventor is unqueſtionably entitled to the beſt acknowledgments of the cultivators of chemical ſcience.

(450.) In the uſe of the furnaces above deſcribed, the attendance of the operator is neceſſary, both for inſpecting the proceſſes, and for ſupplying and animating the fuel. There are ſome operations, of a ſlower kind, that require a gentle heat to be continued for a length of time; which demand little attendance in regard to the operations themſelves, and in which, of conſequence, it is extremely convenient to have the attendance in regard to the fire as much as poſſible diſpenſed with. This end has been anſwered by the furnace called *athanor*; but the uſe of it has been found attended with ſome inconveniences, and it is now generally laid aſide. See ATHANOR; and *Plate* IX. *fig.* 9.

(451.) Various attempts have been made for keeping up a continued heat, with as little trouble as in the athanor, by the flame of a lamp; but the common LAMP FURNACES have not anſwered ſo well as could be wiſhed. The lamps require frequent ſnuffing, and ſmoke much; and the ſoot accumulated on the bottom of the veſſel placed over them, is apt at times to fall down and put out the flame. The largeneſs of the wick, the irregular ſupply of oil from the reſervoir by jets, and the oil being ſuffered to ſink conſiderably in the lamp, ſo that the upper part of the wick burns to a coal, appeared to be the principal cauſes of theſe inconveniences, which were found to be in great meaſure remedied by the following conſtruction. See *Plate* LXIX. *fig.* 2. and 3.

(452.) The lamp A, conſiſts of a braſs pipe 10 or 12 inches long, and about ¼ of an inch wide, inſerted at one end into the reſervoir of the oil, B, and turned up at the other to an elbow, like the bole of a tobacco-pipe, the aperture of which is extended to the width of near two inches. On this aperture is fitted a round plate, having 5, 6, or 7 ſmall holes, at equal diſtances, round its outer part, into which are inſerted as many pipes about an inch long: into theſe pipes are drawn threads of cotton, all together not exceeding what in the common lamps form one wick: by this diviſion of the wick, the flame expoſes a larger ſurface to the action of the air, the fuliginous matter is conſumed and carried off, and the lamp burns clear and vivid.

(453.) The reſervoir B is a cylindric veſſel, 8 or 10 inches wide, compoſed of 3 parts, with a cover on the top. The middle partition communicates, by the lateral pipe, with the wicks; and has an upright open pipe ſoldered into its bottom, whoſe top reaches as high as the level of the wick; ſo that, when this part is charged with oil, till the oil riſes up to the wicks in the other end of the lamp, any further addition of oil will run down through the upright pipe into the lower diviſion of the reſervoir. The upper diviſion is deſigned for ſupplying oil to the middle one; and, for that purpoſe, is furniſhed with a cock in the bottom, which is turned more or leſs, by a key on the outſide, that the oil may drop faſt enough to ſupply the conſumption, or rather faſter, for the overplus is of no inconvenience, being carried off by the upright pipe; ſo that the oil is always, by this means, kept exactly at the ſame height in the lamp. For common uſes, the middle diviſion alone may ſuffice: for, on account of its width, the ſinking of the oil will not be conſiderable in ſeveral hours burning. In either caſe, however, it is expedient to renew the wicks every 2 or 3 days; oftener or ſeldomer according as the oil is more or leſs foul. For the more convenient renewing of them, there ſhould be two perforated plates; that when one is removed, another, with wicks fitted to it, may be ready to ſupply its place.

(454.) A large black led pot, C, of the ſize N° 60. makes a proper furnace for the lamp. To fit one up on purpoſe for this uſe, it requires no other aperture than one in the bottom for admitting air, and one in the ſide for the introduction of the elbow of the lamp. The reſervoir B may ſtand on any convenient ſupport without the furnace. The ſtopper of the ſide aperture conſiſts of two pieces, that it may be conveniently put in after the lamp is introduced; and has a round hole at its bottom fitting the pipe of the lamp. By theſe means, the furnace being ſet upon a trevet or open foot, the air enters only underneath, and ſpreads equally all round, without coming in ſtreams, whence the flame burns ſteady. It is not adviſeable to attempt raiſing the heat higher than about the 450° of Fahrenheit's thermometer; a heat ſomewhat more than ſufficient for keeping tin in perfect fuſion. Some have propoſed giving a much greater degree of heat in lamp furnaces, by uſing a number of large wicks; but when the furnace is ſo heated, the oil emits copious fumes, and its whole quantity takes fire. The balneum, or other veſſel including the ſubject matters, is ſupported over the flame by an iron ring; a bath is here particularly neceſſary, as the ſubject would otherwiſe be very unequally heated, only a ſmall part of the veſſel being expoſed to the flame.

(455.) A laboratory ſhould be provided with balances of the utmoſt accuracy and exactneſs; for the chemiſt, who very frequently operates only upon ſmall quantities, ought to be able, by the

Fig. 1.

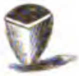
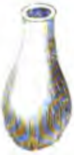


Fig. 2.



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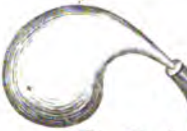

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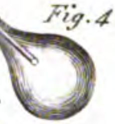

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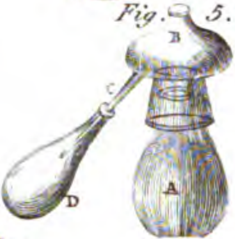

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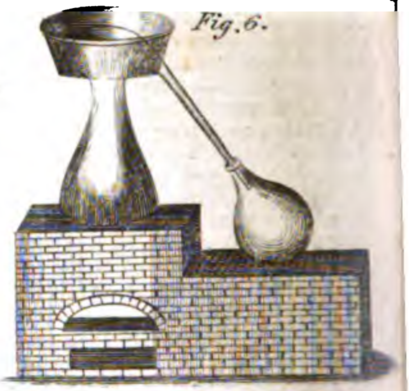
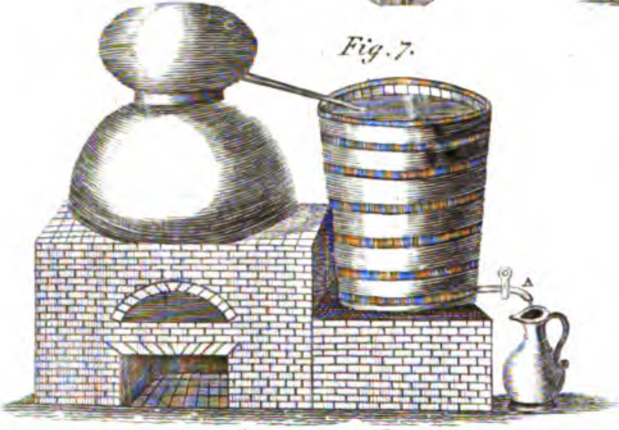


Fig. 7.



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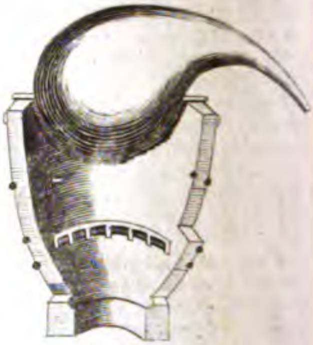


Fig. 8.

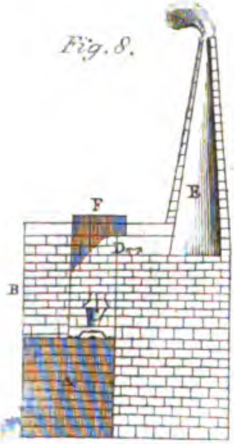


Fig. 9.

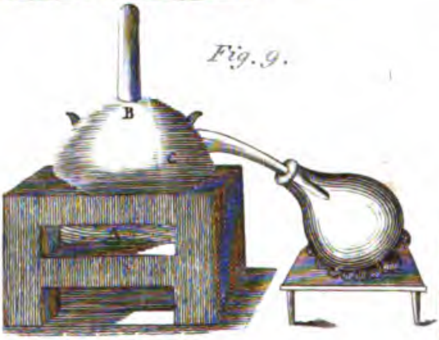


Fig. 13.

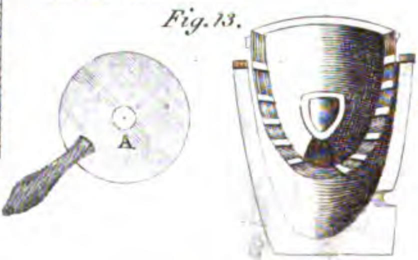


Fig. 11.

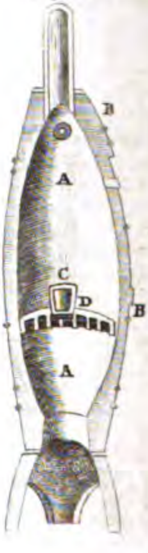
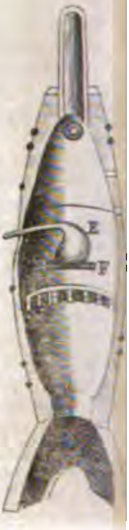


Fig. 12.



ſtrictneſs of his operations, and the accuracy of his apparatus, to produce reſults comparable with thoſe of works in the large way. It frequently happens, that the ſimple eſſay of a ſpecimen of an ore determines the opening of a mine: and it ſcarcely need be pointed out, of how great conſequence it is, to remove every cauſe of error from the operations of chemiſtry; ſince the ſlighteſt error in the works of the laboratory may be attended with the moſt unhappy conſequences, when the application of the principles is made to works in a more extenſive way. See BALANCE, § 3. & *Pl.* 35. *fig.* 3.

(456.) Other chemical apparatus will be neceſſarily treated of, as we ſhall have occaſion to mention the uſe of them; and by thus connecting their deſcription with their uſe, we ſhall ſucceed better in rendering them intelligible to the reader, while by this method his memory will be leſs fatigued. But in the mean time, it is proper here to give a deſcription of the inſtruments delineated on *Plates* LXVII. and LXVIII.

(457.) *Plate* LXVII. *Fig.* 1. Repreſents A CRUCIBLE, which may be made of earth, black lead, forged iron, or platina.

(458.) *Fig.* 2. A CUCURBITE or MATRASS, which is generally formed of glaſs, earth, or metal.

(459.) *Fig.* 3. A RETORT, a veſſel of earthen ware, glaſs, or metal, with a neck bent to one ſide. Some retorts have another neck on the upper part, through which they may be charged, and the opening may be afterwards cloſed with a ſtopper. Theſe are called *tubulated retorts*.

(460.) *Fig.* 3. A RECEIVER; a veſſel uſually made of glaſs, of a ſpherical form, with a ſtraight neck, into which the neck of the retort is commonly inſerted.

(461.) *Fig.* 5. AN ALEMBIC, uſed for the diſtillation of volatile ſubſtances. It conſiſts of a body A, to which is adapted a head B, of a conical figure; with its external circumference depreſſed lower than its neck; ſo that the vapours which are condenſed againſt its ſides, run down into the circular channel formed by its depreſſed part; from whence they are conveyed by the noſe or beak C, into the receiver D.

(462.) *Fig.* 6. AN ALEMBIC, commonly made of metal. The head is contained in a veſſel of cold water, to accelerate the condenſation; a method not ſo good as cooling the receiver, becauſe the coldneſs of the head, in the former caſe, cauſes much of the vapour to fall again into the body.

(463.) *Fig.* 7. THE LARGE STILL uſed in the diſtillation of ardent ſpirits. Inſtead of uſing a refrigeratory or receiver, the ſpirit is made to paſs through a ſpiral pipe, called the worm, which is immerſed in a tub of cold water. During its paſſage it is condenſed, and comes out at the lower extremity of the pipe, A, in a fluid form.

(464.) *Fig.* 8. The common SMALL FURNACE for melting: A the aſh-hole, where the air enters; B the fire-place containing a covered crucible, C, ſtanding on a ſupport of baked earth, which reſts on the grate; D the paſſage into E the chimney. At D is a ſhallow crucible called *a cupel*, placed in the current of the flame; and at F is an earthen cover, to be occaſionally taken off, to ſupply the fire with fuel.

(465.) *Fig.* 9. THE REVERBERATORY FURNACE: A is the fire-place; B the dome and chimney, which is moveable. It ſerves to reflect the flames and cauſes them to ſurround the veſſel C, which is by that means more ſtrongly heated than it could otherwiſe be.

(466.) *Fig.* 10. A FURNACE for open fire, formed by one pot. The lower ſquare apartment is the door of the aſh-pit, and the upper one the door of the fire-place, which, in the intentions this furnace is deſigned for, is kept ſhut. The charcoal is put in at the top, and ſupplied with air by the lower apertures: The intenſity of the fire may be regulated by more or leſs cloſing of the apertures. The round hole in the bottom ſerves to inſert the nozzle of a pair of bellows, which, when the other apertures are ſtopped, converts it into a blaſt furnace.

(467.) *Fig.* 11. A WIND FURNACE, formed by 2 pots A A, applied mouth to mouth. An iron chimney B B compoſed of pieces, by which its length may be regulated ſo as to increaſe the draft at pleaſure, is put on the top. The crucible C, containing the ſubjected matters, is placed upon a circular piece of brick laid upon the grate D, which prevents the cold air from immediately ſtriking the crucible and endangering the breaking it. The charcoal is put through the fire-place door, or larger aperture of the dome, or upper pot, which ſhould always be cloſed immediately after each ſupply of fuel. The two oppoſite holes in the upper part of the dome are for paſſing an iron rod through, to lift it when intenſely heated.

(468.) *Fig.* 12. A FURNACE conſiſting of 2 pots, ſeparated by an iron hoop, in which an opening is cut. It ſerves for a reverberatory furnace for diſtilling with retorts of earthen ware or coated glaſs. The bottom of the diſtilling veſſel E reſts on 2 bars F laid acroſs within the lower pot. If the grate of this furnace be occaſionally changed for a larger, which may be placed near the edge of the lower pot, a muffle, or ſmall earthen oven, may be placed in the midſt of the fire, with its mouth oppoſite the hole in the iron hoop. In this may be performed all proceſſes that require the admiſſion of air, and frequent inſpection, ſuch as aſſays, enamelling, &c.

(469.) *Fig.* 13. AN IMPROVED BLAST FURNACE. The pot, which contains the fuel for this purpoſe, has a number of holes bored at ſmall diſtances, in ſpiral lines, all over it, from the bottom up to ſuch a height as the fuel is deſigned to reach. The crucible is placed upon a proper ſupport at the bottom; and the holes are made, not in a perpendicular direction to it, but oblique, that the ſtreams of air forced through them may but juſt touch it: the crucible is thus in no danger of being cracked by the blaſt, and the impelled heat plays in a kind of ſpiral on its ſurface. The lower pot receives this perforated pot to ſuch a depth that all its holes hang in the cavity; which cavity having no other outlet than the aperture for the bellows, the air blown in through the aperture neceſſarily diſtributes through the perforations of the inner pot. Both pots may be of the largeſt ſize, the external narrow part of the inner falling into the wide mouth of the outer. It wants no addition to its height; but will rather be more commodious for inſpecting and taking out the crucible.

if all the part above where the fuel reaches be ſawed away. The moſt convenient cover for it, is an iron plate with a round hole in the middle, and a handle at one ſide for lifting it. This is repreſented at A.

(470.) *Fig.* 14. A BLOW PIPE, an inſtrument conſiſting of a braſs pipe, about $\frac{1}{8}$ of an inch diameter at one end, the other tapering to a much leſs ſize, with a very ſmall perforation for the wind to paſs through. See BLOW-PIPE, § 2—5. For philoſophical or other nice purpoſes, it is provided with a bowl, B, in which the vapours of the breath are condenſed and detained; and alſo with 3 or 4 ſmall nozzles, with different apertures to be ſlipped on the ſmaller extremity. Theſe are of uſe when larger or ſmaller flames are occaſionally required.

(471.) *Plate* LXVIII. *Fig.* 1. gives a perſpective view of THE CALORIMETER, an inſtrument for meaſuring heat. Its interior ſtructure is repreſented at *fig.* 2. & 5. the former being a horizontal, and the latter a perpendicular ſection. Its cavity is divided into 3 parts: the interior cavity *f f f f*, *fig.* 4. into which the ſubſtances ſubmitted to experiment are put, is compoſed of a grating or cage of iron wire, ſupported by ſeveral iron bars; its mouth, LM, is covered by the lid HG, compoſed of the ſame materials. The middle cavity *b b b b*, *fig.* 2. and 3. contains the ice, which ſurrounds the interior cavity, and is intended to be melted by the caloric of the ſubſtances employed in the experiment. The ice is ſupported by the grate *m m* at the bottom of the cavity, under which is placed the ſieve *n n*. *Fig.* 5. and 6. repreſent theſe ſeparately. In proportion as the ice contained in the middle cavity is melted, by the caloric diſengaged from the body placed in the interior cavity, the water runs through the grate and ſieve, and falls through the conical funnel *c c d*, *fig.* 3. and the tube *x y*, into the receiver F, *fig.* 1. This water may be retained or let out at pleaſure, by the ſtop-cock *u*. The external cavity *a a a a*, *fig.* 2. and 3. is filled with ice, to prevent any effect upon the ice in the middle cavity from the heat of the ſurrounding air; and the water produced from it, is carried off through the pipe ST, which ſhuts by the ſtop-cock *r*. The whole machine is covered by the lid FF. *fig.* 7. which is made of tin and painted with oil colour, to prevent ruſt. The ſubſtances to be operated upon are placed in the thin iron bucket, *fig.* 8. the cover of which has an opening fitted with a cork, into which a ſmall thermometer is fixed. When acids, or other fluids capable of injuring the metal of the inſtruments are uſed, they are contained in the matraſs, *fig.* 9. which has a ſimilar thermometer in a cork fitted to its mouth, and which ſtands in the interior cavity upon the ſmall cylindrical ſupport RS, *fig.* 10.

(472.) In *fig.* 11, A repreſents a WOODEN VESSEL, or tub; B, B, B, is a ſhelf fixed in the tub. When uſed, the tub is filled with water to ſuch an height as to riſe about one inch above the upper ſurface of the ſhelf. C, D, E, are glaſs jars inverted with their mouths downwards, which reſt upon the ſhelf. If theſe, or any other veſſels open only at one end, be plunged under the water, and inverted after they are filled, they will remain full, notwithſtanding their being raiſed out of the water, provided their mouths be kept immerſed, for in this caſe the water is ſuſtained by the preſſure of the atmoſphere in the ſame manner as the mercury in the barometer. It may be eaſily imagined, that if the common air, or any other fluid reſembling common air in lightneſs and elaſticity, be ſuffered to enter theſe veſſels, it will riſe to the upper part, and the ſurface of the water will ſubſide. If a bottle, a cup, or any veſſel in that ſtate which is uſually called *empty*, though really full of air, be plunged into the water, with its mouth downwards, ſcarcely any water will enter, becauſe its entrance is oppoſed by the elaſticity of the included air; but if the veſſel be turned up, it immediately fills, and the air riſes in one or more bubbles to the ſurface. Suppoſe this operation to be performed under one of the jars which are filled with water: the air will aſcend as before, but, inſtead of eſcaping, it will be detained in the upper part of the jar. In this manner, air may be emptied out of one veſſel into another, by an inverted pouring, whereby the air is made to aſcend from the lower to the upper veſſel, in which the experiments are performed, by the weightier fluid. When the receiving veſſel has a narrow neck, the air may be poured through a glaſs funnel, F.—G is a glaſs body or bottle, whoſe bottom is blown very thin, that it may ſupport the heat of a candle, ſuddenly applied, without cracking. In its neck is fitted, by grinding, a tube H, curved nearly in the form of the letter *ſ*. The bottle, G, contains a fluid, in the act of combining with a ſubſtance that gives out air, which paſſes through the tube into the jar E, under whoſe mouth the other extremity of the tube is placed. At I is a ſmall retort of glaſs or earthen ware, whoſe neck being plunged in the water, beneath the jar C, is ſuppoſed to emit the elaſtic fluid, extricated from the contents of the retort, which is received in the jar.

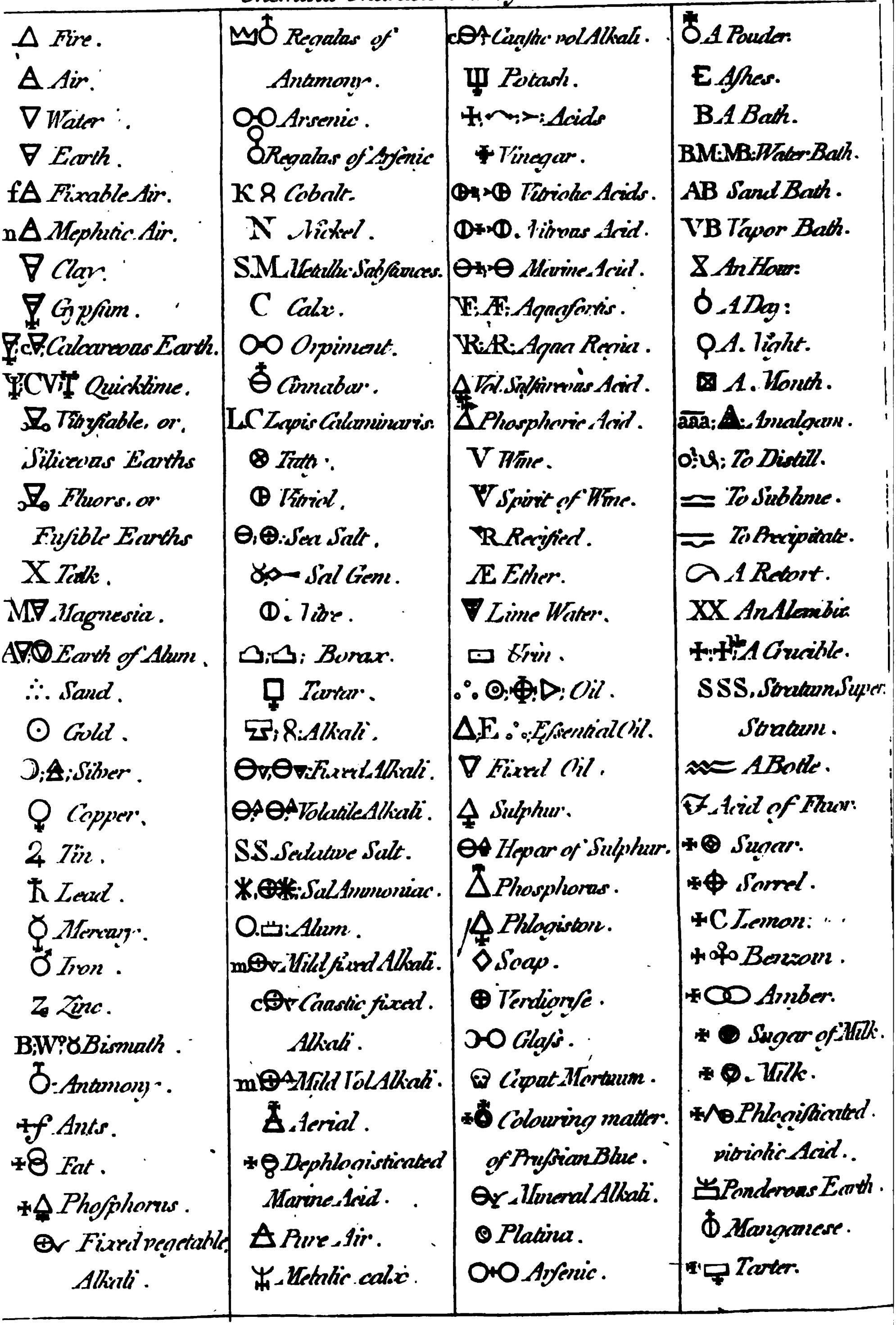
(473.) *Fig.* 12. A WIRE-STAND for a gallipot, or any thing that is ſupported at a conſiderable height within a jar.

(474.) *Fig.* 13. An APPARATUS for impregnating water with the carbonic acid gas. The quart bottle C, is filled with water, and inverted in the baſon D, which likewiſe contains a little water, A is a half pint phial, into which broken pieces of marble or chalk are put; and upon them is poured as much water, rendered very acid by a mixture of oil of vitriol, as may fill the bottle two thirds. B is a bladder, whoſe neck is tied faſt round a perforated cork of a tapering figure. After the efferveſcence of the chalk and the acid has begun, the cork is to be thruſt into the neck of the phial A, the bladder being previouſly emptied by preſſure. Carbonic acid gas will eſcape from the chalk, and inflate the bladder. When this laſt is full, it muſt be diſengaged from the bottle, and the bended tube E muſt be thruſt into the orifice of its cork. The aperture of the tube being then placed beneath the mouth of the bottle C, it is eaſy to diſcharge the aërial contents of the bladder by preſſure into this laſt. The uſe of the bladder, in this operation, is only to prevent any of the fluid contents of the bottle A, from paſſing into the bottle C, which would happen in the violent ſtate

CHEMISTRY

Plate LXVI.

Chemical Characters or Symbols



Fire.
Air.
Water.
Earth.
Fixable Air.
Mephitic Air.
Clay.
Gypsum.
Calcareous Earth.
Quicklime.
Vitryfiable, or, Siliceous Earths
Fluors, or Fusible Earths
Talk.
Magnesia.
Earth of Alum.
Sand.
Gold.
Silver.
Copper.
Tin.
Lead.
Mercury.
Iron.
Zinc.
Bismuth.
Antimony.
Ants.
Fat.
Phosphorus.
Fixed vegetable Alkali.

Regulus of Antimony.
Arsenic.
Regulus of Arsenic
Cobalt.
Nickel.
Metallic Substances.
Calx.
Orpiment.
Cinnabar.
Lapis Calaminaris.
Tutty.
Vitriol.
Sea Salt.
Sal Gem.
Nitre.
Borax.
Tartar.
Alkali.
Fixed Alkali.
Volatile Alkali.
Sedative Salt.
Sal Ammoniac.
Alum.
Mild fixed Alkali.
Caustic fixed. Alkali.
Mild Vol Alkali.
Aerial.
Dephlogisticated Marine Acid.
Pure Air.
Metalic calx.

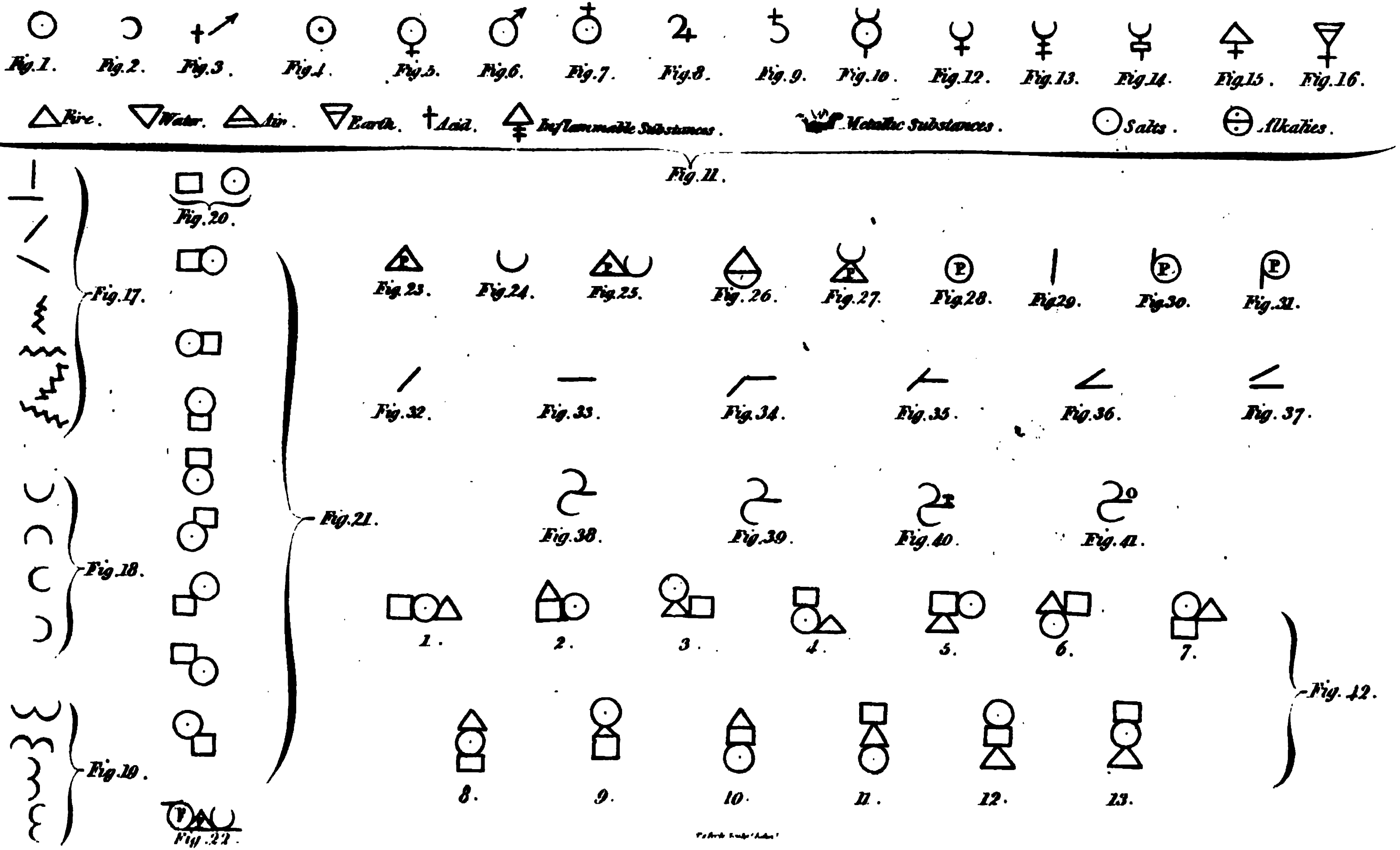
Caustic vol Alkali.
Potash.
Acids.
Vinegar.
Vitriolic Acids.
Nitrous Acid.
Marine Acid.
Aquafortis.
Aqua Regia.
Vol. Sulfureous Acid.
Phosphoric Acid.
Wine.
Spirit of Wine.
Rectified.
Ether.
Lime Water.
Urin.
Oil.
Essential Oil.
Fixed Oil.
Sulphur.
Hepar of Sulphur.
Phosphorus.
Phlogiston.
Soap.
Verdigrise.
Glass.
Caput Mortuum.
Colouring matter of Prussian Blue.
Mineral Alkali.
Platina.
Arsenic.

A Powder.
Ashes.
A Bath.
Water Bath.
Sand Bath.
Vapor Bath.
An Hour.
A Day.
A Night.
A Month.
Amalgam.
To Distill.
To Sublime.
To Precipitate.
A Retort.
An Alembic.
A Crucible.
Stratum Super Stratum.
A Bottle.
Acid of Fluor.
Sugar.
Sorrel.
Lemon.
Benzoin.
Amber.
Sugar of Milk.
Milk.
Phlogisticated vitriolic Acid.
Ponderous Earth.
Manganese.
Tarter.

Plate LXV

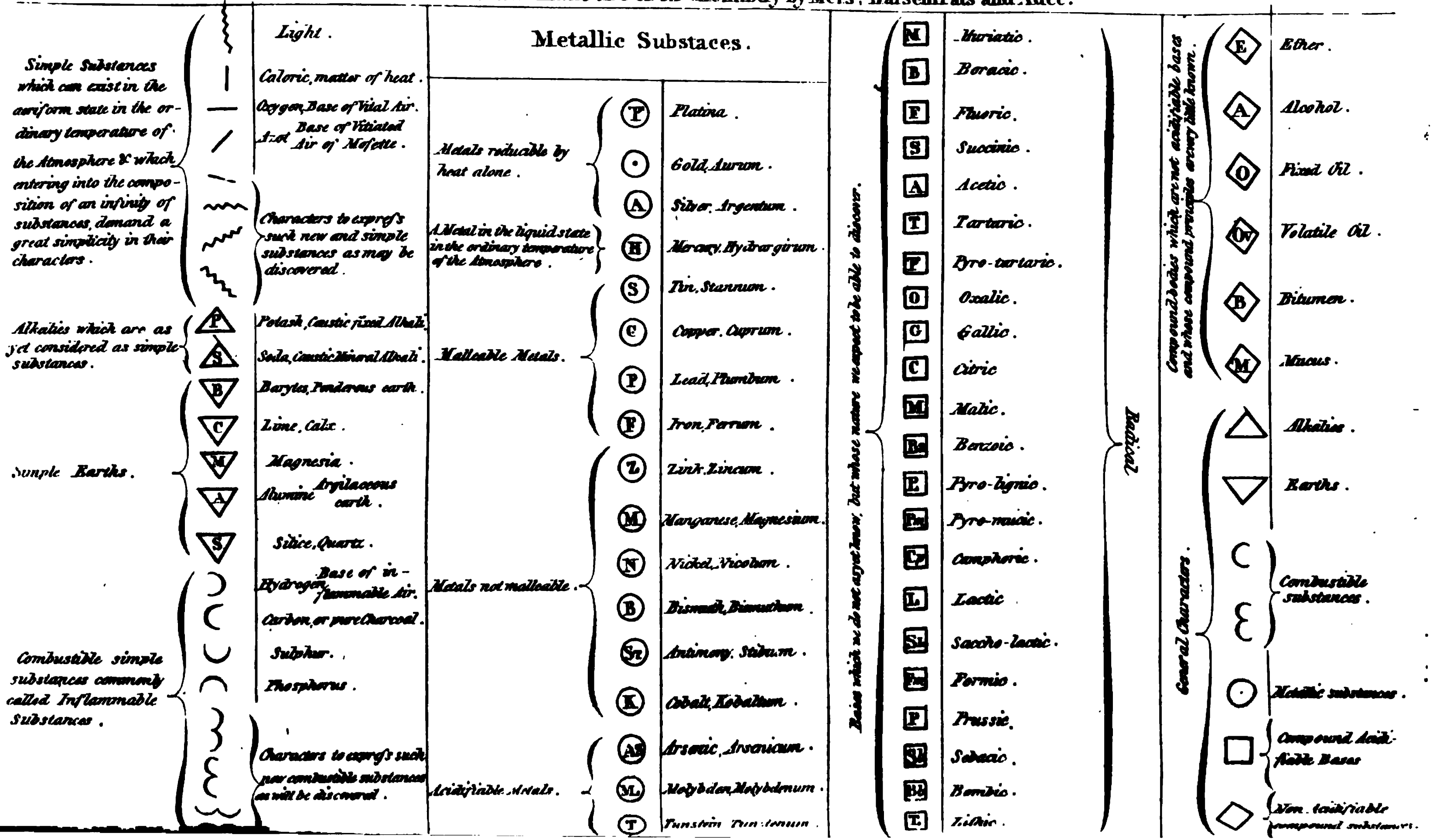
CHEMISTRY.

Chemical Characters used by the Ancients.



CHEMISTRY.

Table of the Characters to be made use of in Chemistry by Mefs.rs Hafsenfrats and Adet.


Simple Substances which can exist in the aeriform state in the ordinary temperature of the Atmosphere & which entering into the composition of an infinity of substances, demand a great simplicity in their characters.
Light.
Caloric, matter of heat.
Oxygen, Base of Vital Air.
Azot Base of Vitiated Air of Mefette.
Characters to exprefs such new and simple substances as may be discovered.
Alkalies which are as yet considered as simple substances.
Potash, Caustic fixed Alkali.
Soda, Caustic Mineral Alkali.
Simple Earths.
Barytes, Ponderous earth.
Lime, Calx.
Magnesia.
Alumine Argilaceous earth.
Silice, Quartz.
Combustible simple substances commonly called Inflammable Substances.
Hydrogen Base of inflammable Air.
Carbon, or pure Charcoal.
Sulphur.
Phosphorus.
Characters to exprefs such new combustible substances as will be discovered.
Metallic Substaces.
Metals reducable by heat alone.
Platina.
Gold, Aurum.
Silver, Argentum.
A Metal in the liquid state in the ordinary temperature of the Atmosphere.
Mercury, Hydrargirum.
Malleable Metals.
Tin, Stannum.
Copper, Cuprum.
Lead, Plumbum.
Iron, Ferrum.
Metals not malleable.
Zink, Zincum.
Manganese, Magnesium.
Nickel, Nicolum.
Bismuth, Bismuthum.
Antimony, Stibium.
Cobalt, Kobaltum.
Acidifiable Metals.
Arsenic, Arsenicum.
Molybden, Molybdenum.
Tunstein Tunstenum
Bases which we do not as yet know, but whose nature we expect to be able to discover.
Muriatic.
Boracic.
Fluoric.
Succinic.
Acetic.
Tartaric.
Pyro-tartaric.
Oxalic.
Gallic.
Citric
Malic.
Benzoic.
Pyro-lignic.
Pyro-mucic.
Camphoric.
Lactic
Saccho-lactic.
Formic.
Prussic.
Sebacic.
Bombic.
Lithic.
Radical
Compound bodies which are not acidifiable bases and whose compound principles are very little known.
Ether.
Alcohol.
Fixed Oil.
Volatile Oil.
Bitumen.
Mucus.
General Characters.
Alkalies.
Earths.
Combustible substances.
Metallic substances.
Compound Acidifiable Bases
Non-acidifiable compound substances.
N
B
F
S
A
T
P
O
G
C
M
E
Cp
L
P
E
A
O
B
M

of ebullition, if the tube E were to paſs directly from the bottle A to C.

(475.) In the above operation, the manipulation is ſimpler, if the bladder B, *fig.* 14. have two holes at its oppoſite ends, the one containing a cork conſtantly kept in the neck of the bottle A, and the other faſtened round the tube E, which then remains conſtantly beneath the mouth of C; and the air is preſſed up as occaſion may demand.

(476.) *Fig.* 15. repreſents Dr Nooth's machine for the above purpoſe. It conſiſts of 3 glaſs veſſels; A, B, and C. The lower veſſel C contains the effervescent materials: it has a ſmall orifice at D, ſtopped with a ground ſtopper, at which an additional ſupply of either acid, water, or chalk, may be occaſionally introduced. The middle veſſel B is open both above and below. Its inferior neck is fitted by grinding into the neck H of the lower veſſel. In the former is a glaſs valve, formed by two pieces of tube, and a lens, which is moveable, between them, as repreſented in *fig.* 16. This valve opens upwards, and ſuffers the air to paſs; but the water cannot return through the tubes, partly becauſe the orifice is capillary, and partly becauſe the flat lens covers the hole. The middle veſſel is furniſhed with a cock E, to draw off its contents The upper veſſel A is fitted, by grinding, into the upper neck of the middle veſſel B. Its inferior part conſiſts of a tube, that paſſes almoſt as low as the centre of the middle veſſel. Its upper orifice is cloſed by a ſtopper F. When this apparatus is to be uſed, the effervescent materials are put into the lower veſſel; the middle veſſel filled with pure water, and put in its place; and the upper veſſel is nearly ſtopped, and likewiſe put in its place. The conſequence is, that the carbonic acid gas, paſſing through the valve at G, aſcends into the upper part of the veſſel B, where, by elaſticity, it re-acts on the water, and forces part up the tube into the veſſel A; part of the common air, in this laſt, being compreſſed, and the reſt eſcaping by the ſtopper, which is made of a conical figure, that it may be eaſily raiſed. As more carbonic acid gas is extricated, more water riſes, till at length the water in the middle veſſel falls below the lower orifice of the tube; carbonic acid gas then paſſes through the tube into the upper veſſel, and expels more of the common air by raiſing the ſtopper. In this ſituation the water in both veſſels, being in contact with a body of carbonic acid gas, becomes ſtrongly impregnated with that fluid, after a certain time.

(477.) *Fig.* 17. exhibits an apparatus of veſſels, in which the different products of bodies may be conveniently examined. A is a matraſs, which communicates with the receiver B, by a tube that reaches very near the bottom of the latter. The upper part of this receiver communicates in the ſame manner with the ſecond receiver C, by a tube reaching nearly to the bottom of C. In like manner C communicates with D, and from D proceeds a recurved tube E, which may be inſerted beneath an inverted veſſel of water, or mercury.

(478.) *Fig.* 18. exhibits Mr Woulfe's improvement in the receiver in diſtillation. A is the retort; B an intermediate veſſel, called an adopter, which is occaſionally uſed; C the receiver, having two necks; one at D, inſerted into a bottle which receives the products condenſed in the receiver; and the other, at E, tranſmits the more volatile or aëriform products into a baſon F, containing water; beneath the ſurface of which the extremity of the neck E is plunged. If the neck E be made large, and the water from the baſon F ſhould, by a rapid condenſation in C, be forced up the neck, the ſurface of the water in F will fall ſo much as to leave the lower orifice of E uncovered, before any conſiderable riſe can take place; but if E were narrower, its whole capacity would be filled, and the water would run over into C before the fall in F would be ſufficient to uncover the orifice of E, and reſtore the equilibrium, by admitting common air.

Sect. III. *Of* Chemical Characters.

(479.) We cannot conclude our account of the inſtruments of chemiſtry, without taking notice of the various *characters* and *figures*, uſed by ancient and modern chemiſts as *inſtruments of abbreviation*. See *Plates* LXVI, LXX, and LXXI.

(480.) It is not known when chemiſts firſt began to make uſe of characters. Our utmoſt inquiries can only diſcover upon what principles the ancients formed the characters of the metallic ſubſtances. They perſuaded themſelves that the celeſtial bodies had a ſenſible influence on all the animate and inanimate ſubſtances of the terreſtrial globe, and therefore diſtinguiſhed the metals into *ſolar* or coloured metals, and into *lunar* or white metals. The metals of theſe two claſſes were next ſubdivided into *perfect metals*, *ſemi-perfect*, and *imperfect*; the *perfection* was expreſſed by a circle, *fig.* 1. *Plate* LXX; the *ſemi-perfection*, by a ſemi-circle, *fig.* 2; and the *imperfection* by a croſs or dart, *fig.* 3. Thus gold, which was the ſolar metal by excellence, was repreſented by a plain circle, *fig.* 4. This figure was common to the metals of the firſt claſs, ſuch as copper, *fig.* 5; iron, *fig.* 6; and antimony, *fig.* 7; but at the ſame time combined with the ſign of imperfection. Silver, which was regarded as a ſemi-perfect lunar metal, was expreſſed by a ſemi-circle, *fig.* 2; tin, *fig.* 8; and lead, *fig.* 9, had alſo the ſemi-circle for character, as belonging to the ſame claſs; but were diſtinguiſhed from ſilver by the croſs or dart. In fine, mercury, which was eſteemed an imperfect metal, at the ſame time both ſolar and lunar, had the diſtinctive marks of theſe two claſſes, and was expreſſed by a circle ſurmounted by a ſemi-circle, to which was added a croſs, *fig.* 10.

(481.) This very whimſical method of characterizing different bodies was at length diſcontinued. For as new ſubſtances were diſcovered new characters became neceſſary; and theſe introduced a conſiderable degree of confuſion, as may be ſeen by examining the characters employed from the time of Geoffroy to that of Bergman. The laſt chemiſt employed, as general characters, a triangle, a circle, a kind of crown, and a croſs. The triangular figure modified different ways, repreſented the four elements of the ancients, and alſo the inflammable ſubſtances, as phoſphorus and ſulphur; the little crown ſignified the metallic ſubſtances; the circle belonged to the ſalts, and with ſome modifications alſo afforded characters for the alkalis; in fine the croſs was uſed only to expreſs the different acid ſubſtances, *fig.* 21.

(482.) BERGMAN had alſo repreſentative ſigns which he uſed to expreſs the different ſubſtances, whoſe claſſes are indicated by the characters that have been mentioned. It would ſeem to be neceſſary that the character for earth in general, which is a triangle with its baſe upwards, interſected by an horizontal line, ſhould ſerve, with ſome modifications, to expreſs all the different kinds of earth. But Bergman has employed the triangular figure to repreſent only ſilice and alumine. Lime, fig. 12; magneſia, fig. 13; and barytes, fig. 14. notwithſtanding they have the properties of earth in a very high degree, are repreſented by characters that have no manner of analogy with that given to earth in general. The croſs, which in his ſyſtem particularly characteriſed the acids, is found combined with the ſigns of an infinity of ſubſtances which are very far from having the properties of acids, ſuch as lime, fig. 11; copper, fig. 5; tin, fig. 8; lead, fig. 9; ſulphur, fig. 15; antimony, fig. 7; gum, fig. 16; and mercury, fig. 10. He has not made any uſe of the character with which he repreſented the metals in general to expreſs them in particular. He gave them for characteriſtic ſigns, croſſes, circles, and ſemi-circles; but the circle had been before beſtowed upon the claſs of ſalts. It ſhould ſeem from this that he wanted to expreſs ſome ſuppoſed likeneſs between the metals and the ſaline ſubſtances. It alſo appears, on peruſing his tables, as if there were an analogy between lime and the oxides; for when he wants to repreſent an oxidiſied metal, he always joins to it the character of lime!

(483.) It is evident from this account of the more modern characters, that there are too many incoherencies and abſurdities among them, to allow them any longer to exiſt; particularly as they are not adequate to the expreſſion of the modern improvements. In order to obviate theſe inconveniences new tables have been conſtructed, by Meſſrs HASSENFRATZ and ADET, upon the following principles of uniformity and propriety.

(484.) The ſubſtances analyſed by chemiſts may be divided into two great claſſes, SIMPLE and COMPOUND. By the words *ſimple bodies* are to be underſtood, ſuch as are not at preſent capable of any further analyſis; the *compound bodies*, on the contrary, are thoſe whoſe conſtituent principles can be ſeparated by art. From this it is evident that there ought to be two great claſſes of characters; the firſt intended to expreſs the ſimple ſubſtances, and the others to ſignify the compound; but as the compound bodies are all formed by the different combinations of ſimple ſubſtances, the characters to expreſs compound bodies ſhould be made by the junction of the different characters of ſimple bodies.

(485.) The diſcoveries of the moderns indicate that the claſs of the 54 ſimple ſubſtances at preſent known, may be divided into ſix genera, viz. 1. Subſtances which appear to enter into the compoſitions of the greater number of bodies; 2. alkaline and terreſtrial ſubſtances; 3. combuſtible ſubſtances; 4. metallic ſubſtances; 5. acidifiable ſubſtances, which there is reaſon to ſuppoſe are formed of ſeveral principles, and whoſe decompoſition may be foreſeen; ſuch are, for example, the baſes of the vegetable acids; and, 6. compound ſubſtances, with whoſe component principles we are not yet acquainted. Each of theſe genera is divided into a number of more or leſs conſiderable ſpecies.

(486.) This diviſion of ſimple bodies requires that each genus ſhould have a ſign proper to itſelf, and which may with ſome modifications be employed to expreſs the different ſpecies of its genus. This circumſtance has been attended to in forming the preſent chemical characters. To the firſt genus of ſimple bodies a right line is given; to the ſecond a triangle; to the third a ſemi-circle; to the fourth a circle; to the 5th a ſquare; and to the ſixth a ſquare with its point upwards.

(360.) The right line, which is the character for the firſt genus, can have 4 different and diſtinct poſitions; it may be either vertical, horizontal, inclined from the right to the left, or from the left to the right. But by rendering the line zigzag or wavy, and placing it in the ſame poſitions as the right line, eight characters, perfectly diſtinct from one another, may be obtained: fig. 17. But as there are only four known ſpecies of the firſt genus, viz. light, caloric, oxigene, and azote, there remain four characters which future chemiſts may employ to indicate whatever new ſubſtances may be diſcovered in the firſt genus of ſimple bodies.

(488.) The ſemi-circle, which expreſſes the inflammable ſubſtances, has, like the right line, four perfectly different poſitions. It can open upwards, or downwards, to the right, and to the left, fig. 18. Theſe four poſitions of the ſemi-circle afforded characters for the four ſpecies of bodies in the ſecond genus; but as the ſemi-circle can be doubled, and by that means form a character ſimple enough, which can be placed in poſitions ſimilar to thoſe of the ſemi-circle, fig. 19. it follows that four characters remain, which can be uſed, whenever any thing new may be diſcovered in the genus of inflammable ſubſtances.

(489.) The triangle, which has been employed for the chracteriſtic ſign of the alkaline and earthy ſubſtances, can be placed only in two different poſitions; † it can have its vertex either upwards or downwards; † yet it is neceſſary to produce characters for all the earthy ſubſtances by the aid of theſe two poſitions of the triangle: this has been effected by giving to the alkalis the triangle with its point upwards, and to the earths the triangle with its point downwards, and by inſcribing in the triangle, which expreſſes each ſpecies of alkali or earth, the firſt letter of the Latin name of that particular ſubſtance. Thus, for example, Potaſh is expreſſed by a triangle with its point upwards, in the middle of which is inſcribed a P; in like manner lime is expreſſed by a reverſed triangle, containing within it a C.

(490.) The circular figure, which has been choſen to diſtinguiſh the metallic, or the 4th genus,

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† *Meſſrs* HASSENFRATZ *and* ADET *ſeem not to have adverted, that the triangle admits of* other two poſitions *perfectly diſtinct; viz. by placing the vertex to the* right *or to the* left.

nus, preſents for its modifications greater difficulties than the triangle. It is managed by inſerting in each of the circles which repreſent each ſpecies of this genus, the initial letter of the Latin name of each metallic ſubſtance, taking care at the ſame time to repreſent gold by a circle with a point at its centre, merely for the ſake of preſerving the ancient character; the Latin initial letters have been employed becauſe the Latin names are univerſally known.

(491.) The ſquare, adapted to the 5th genus, or that of the acidifiable ſubſtances, which are ſuppoſed to be formed of ſeveral principles, whoſe decompoſition may be foreſeen, have been modified in the ſame way; each ſquare contains within it the initial letter of the ſubſtance which it ſhould ſignify. The ſame is done for the ſquare with its angle upwards, uſed to ſignify the undecompounded mixed bodies.

(492.) As compound ſubſtances reſult from the combination of ſimple ſubſtances, their characters ſhould alſo reſult from the union of the characters of theſe ſame ſimple ſubſtances. Thus the firſt law to be obſerved in the formation of characters for mixed bodies, is to join together the characters of ſimple ſubſtances, two and two, to repreſent the compoſitions of two ſubſtances; three and three, to repreſent the compoſitions of three ſubſtances; and four and four, to repreſent the bodies reſulting from the union of 4 ſimple ſubſtances, &c. Therefore, if the comparative quantities of the component principles in compound bodies were always the ſame, and if the compound bodies always preſented themſelves in the ſame ſtate and with the ſame properties, no other rule but the above would be neceſſary; but as two ſubſtances can have not only a degree of reciprocal ſaturation, but alſo form combinations in different proportions, in which they produce compoſitions ſenſibly different from thoſe formed by their union with reciprocal ſaturation; as is evident from the union of ſulphur with oxigene; it therefore follows that, by the aſſiſtance of two characters, which, joined together, repreſent the combination of ſulphur and oxigene, the different ſtates in which this combination can exiſt ſhould be expreſſed. This is effected by diverſifying the reſpective poſitions of the characters which repreſent theſe ſubſtances.

(493.) It is alſo neceſſary that the characters of compound bodies be joined together, in order that the characters of ſimple ſubſtances placed next to one another ſhould not be miſtaken for them. Two characters joined together can have 8 different poſitions, viz. two horizontal, two vertical, two oblique to the right, and two oblique to the left. Thus, theſe two characters, fig. 20, can be combined as in fig. 21; but the oblique poſitions do not preſent ſufficient diſtinction. They have therefore been rejected, and there only remain 4 poſitions, viz. two horizontal and two vertical; but in the compoſitions of theſe ſubſtances it matters little whether one of them be placed on the right ſide or on the left. Thus the two horizontal poſitions are reduced to one; and conſequently theſe two characters can have only three poſitions, viz. one horizontal and two vertical. The poſition of the two characters upon the ſame horizontal line is to indicate that the ſaturation is reciprocal, and that there is an equality in the proportions of the principles which compoſe the compound ſubſtance repreſented. The vertical poſitions, on the contrary, are to ſignify that there does not exiſt a reciprocal ſaturation, or equality of proportion, among the component principles of a compound body; ſo that the character which is to be placed inferior to the others, is to ſignify that the ſubſtance which it repreſents is in exceſs of proportion in compariſon to the others.

(494.) Suppoſe, for example, a combination of ſulphur and pot-aſh, or what is called ſulphuret of pot-aſh; it may happen that the ſulphur and the pot-aſh are in a ſtate of reciprocal ſaturation, and it may alſo happen, that the one or the other of the two component principles of this ſulphuret of pot-aſh is in greater proportion than the other; and either of theſe ſtates can eaſily be expreſſed according to theſe rules. Thus the character of pot-aſh being as in fig. 23. and that of ſulphur as in fig. 24, the combination of ſulphur and pot-aſh, in which there is a reciprocal ſaturation, can be expreſſed by fig. 25; and the combination of ſulphur and pot-aſh, where the ſulphur predominates, can be ſignified by fig. 26; and, in fine, the combination of ſulphur and pot-aſh, in which the latter ſubſtance is in ſuperabundance, may take its diſtinguiſhing character as in fig. 27. This muſt be a general rule for all the compound bodies, be their nature what it may. But a little deviation is neceſſary in the following inſtances:

(495.) Heat, according to its degree of intenſeneſs, cauſes great variation in the ſtate of bodies. In proportion to the quantity of caloric with which ſubſtances combine, they are in a ſolid, liquid, or aeriform ſtate. Therefore caloric muſt be conſidered as combined with different bodies in 3 very diſtinct ſtates; but as every ſubſtance in nature is at all times combined with more or leſs caloric, it has been thought proper not to repeat too frequently the character of caloric, but to exclude it whenever it is intended to ſignify a body in a ſolid ſtate, and only to employ it to repreſent the liquid ſtate, and the ſtate of elaſtic fluidity; taking care, according to the fore-mentioned rule, to put the ſign of caloric at the top of the other characters when it is intended to ſignify fluidity, and at the bottom of the other characters when it is deſigned to expreſs the elaſtic aeriform ſtate. Thus, for example, the character of lead being fig. 28, and that of caloric fig. 29; lead in the ſtate of ſolidity will be repreſented by fig. 28; when in the liquid ſtate by fig. 30; and when in the ſtate of elaſtic fluidity by fig. 31. Thus caloric is an exception to the general rule, and is to have only two poſitions inſtead of 3 in all its combinations. See *Plate* LXXI.

(496.) Oxigene in its union with the acidifiable ſubſtances makes the 2d exception to this general rule. For oxigene combined in different proportions to the different acidifiable ſubſtances, produces compoſitions whoſe properties are too remarkable to ſuffer them to be miſtaken or confounded with one another. It produces, 1. oxides; 2. acids in which the acidifiable baſe predominates; 3. acids in which there is a reciprocal ſaturation; 4. by combining again with an acid whoſe two principles

ples are reciprocally ſaturated, it produces a compoſition which is diveſted of the characteriſtic properties of acids; but in this ſtate the force of its retention is ſo inconſiderable, that the action of a few rays of light is ſufficient to ſet it at liberty, and make it regain its elaſtic ſtate.

(497.) This laſt production of the combinations of oxigene is well known only in the oxigenated muriatic acid; while the oxide of ſulphur, the ſulphureous acid, and the ſulphuric acid, preſent us with the other compoſitions which we have mentioned. Nevertheleſs, oxigene in its combinations with azote appears to offer the 4 combinations of which we ſpeak. Nitrous gas or *oxide of azote* is the combination of oxigene and azote, in which the acid properties are not at all developed. The nitrous acid, which lets eſcape nitrous gas, is the combination of oxigene and of azotic gas in which the acidifiable baſe is in ſuperabundance. The nitrous acid, which is of a white colour, and does not diſengage any nitrous gas, when united with water, is a combination of oxigene and azote, in which there is a reciprocal ſaturation, and the ſort of nitrous acid which has been ſaid to be oxigenated nitric acid.

(498.) Thus, as oxigene combined with an acidifiable ſubſtance can produce in certain caſes 4 very diſtinct compoſitions, the character of oxigene therefore muſt have 4 different poſitions. Theſe 4 poſitions have been given it by placing the character of oxigene at the top of the character of the acidifiable baſe, to indicate the combination which is not acid; by placing it at the middle of the character of the acidifiable baſe, to indicate the combination in which the acidifiable baſe predominates; at the bottom of the character of the acidifiable baſe, to indicate the combination in which there is a reciprocal ſaturation of the two principles; and, in fine, by placing it under the character of the acidifiable baſe, and in detaching it a little, to ſhew that the oxigene is in ſuperabundance in the compoſition, and that a very little force is requiſite to diſengage it. Thus, if it be wanted to expreſs the combinations of oxigene and azote, the character of azote, being fig. 32, that of oxigene, fig. 33, the character of nitrous gas is to be fig. 34, that of nitrous acid 35, that of nitric acid fig. 36, and that of oxigenated nitric acid fig. 37.

(499.) Several of the vegetable acids, which we have not yet been able to decompoſe with ſufficient accuracy to know their conſtituent principles, have probably the ſame baſe, and owe their acid properties to the oxigene; but as it appears that the differences preſented by theſe acids depend on the different proportions of the acidifiable baſe and oxigene, and that the proportions of the acidifiable baſe and oxigene vary in each of theſe acids, it follows, that to indicate theſe different kinds of acids, characters diſtinct from thoſe which have been already uſed, ſhould be invented, as thoſe at preſent in uſe are not ſufficient. But, as theſe acids appear to have for conſtituent principles carbone, hydrogene, and oxigene, they can be eaſily expreſſed by uniting the 3 characters of theſe 3 ſubſtances in the manner indicated by their comparative proportions, and by placing over the character of oxigene the initial letter of the Latin name of the acid.

(500.) For example: To expreſs by characters the tartareous and the oxalic acids, let us here imagine that in the firſt there are ten parts of carbone, five of hydrogene, and ten of oxigene; and that in the ſecond there are 9 parts of carbone, ſix of hydrogene, and ten of oxigene; it follows, that, according to theſe principles, theſe two acids ſhould be written in the ſame manner, for in both caſes the carbone is in exceſſive proportion in compariſon to the hydrogene, ſo that the tartareous acid would be repreſented as in fig. 38, and the oxalic acid as in fig. 39. Thus it could not be indicated that the hydrogene, as is ſuppoſed, is in greater proportion in the oxalic acid, than in the tartareous acid, and that conſequently they muſt be different acids; but all equivocation may be prevented by writing, after what has been ſaid, the character of the tartareous acid as repreſented fig. 40, and the oxalic acid as fig. 41.

(501.) This example is ſufficient to ſhew, that although there may be found a greater number of acids, with baſes compoſed in the ſame manner; yet by theſe means can be expreſſed the different ſorts of acids reſulting from the combinations of theſe principles in proportions too ſmall to permit them to be eaſily repreſented according to the general rules. Theſe chemical characters, by being properly multiplied or joined together as in fig. 42, ſeem ſufficient to repreſent all the combinations at preſent known, and even ſuch as may be expected to be diſcovered in future by chemical analyſis.

(502.) After all, it may be aſked, *Cui bono?*—What advantage is the chemiſt to expect from the uſe of characters at all?—Why not write every word and the name of every poſſible combination in chemiſtry, in plain intelligible language, which the unlearned or the young ſtudent may at once underſtand, without a poſſibility of miſtake?—One view which the ancient chemiſts evidently had, in adopting characters, was to conceal their diſcoveries from vulgar eyes. And this the alchemiſts honeſtly acknowledged, when they uſed not only ambiguous and myſtic characters, but metaphorical language, to conceal their myſteries; But it appears to be quite unworthy of the liberal character of the preſent age, to ſuppoſe modern chemiſts to be influenced by any ſuch motives. The only other ſuppoſition we can make is, that characteriſtic ſymbols are continued or adopted, for the purpoſe of ſaving circumlocution, or too frequently repeating the ſame terms. But whether theſe trifling inconveniences are not greatly overbalanced, by the time loſt in acquiring the uſe of reading and writing the beſt ſet of characters, that it is poſſible for ingenuity to invent, as well as by the poſſibility of miſtake and miſapprehenſion in the uſe of them, not to add the unneceſſary cloud of *myſtery*, that they throw upon a liberal ſcience, we leave to future chemical authors to determine.

PART III.

CHEMICAL PROPERTIES OF BODIES.

(503.) Having explained the general principles of Chemiſtry, and detailed what is known concerning theſe two important agents *light* and *caloric*, we now come to an examination of the properties of bodies by the principles of Chemiſtry. All the bodies in nature fall under this examination, and it is neceſſary, for the ſake of perſpicuity, that a convenient order, or arrangement, ſhould be adopted. We formerly ſtated the inſufficiency of the ancient diviſion of bodies into four elements, Earth, Water, Air, Fire, and obſerved that we know nothing of the elements of bodies. That the probability is there is only one, or at moſt two, elementary bodies. That chemiſts hold all bodies to be elements which they cannot farther decompoſe. Of this ſort, there are about 49 bodies which have not been decompoſed by any proceſs yet invented. It would, however, be very abſurd to reckon theſe bodies elementary in fact; although we are ignorant of the nature of their compoſition. But the perfection of chemiſtry would conſiſt in our attaining an exact knowledge of the elements of bodies, and the mode by which the various compounds are formed. We might then begin with the ſimpleſt bodies, and proceed through their ſeveral compounds, with all the accuracy of the Mathematical Sciences, which commence with axioms and definitions, and terminate in general theorems. But the ſtate of our knowledge concerning ſimple bodies will not allow this arrangement to be followed out; though we ſhall endeavour to adhere to it as much as poſſible, and ſhall conſider bodies in the combined order of their ſimplicity, and of their importance as chemical agents.

(504.) The following diviſion, it is hoped, may exhibit a clear view of the ſubject.

I. Gaseous Bodies.
II. Inflammable Solids,
III. Acids.
IV. Inflammable Liquids,
V. Alkalies.
VI. Earths,
VII. Metals.
VIII. The Atmosphere,
IX. Waters.
X. Minerals.
XI, Vegetables.
XII. Animals.
XIII. Application of Chemistry to Arts and Manufactures.

DIVISION. I.

Gaseous Bodies.

(505.) Theſe bodies were called *airs* at their firſt diſcovery; but as air is a generic term which includes the whole of them, the term *gas* has been adopted from the German, which denotes fluids that are colourleſs, like atmoſpheric air, and which are elaſtic at the medium temperature of our atmoſphere. Many bodies, ſuch as water, become elaſtic at a particular temperature; but return to a liquid, or ſolid ſtate, when their temperature is diminiſhed. Such elaſtic bodies are diſtinguiſhed from gaſes by the name of *vapours*.

(506.) The convertibility of a great variety of bodies into elaſtic vapours, by the addition of caloric, has led philoſophers to ſuppoſe that all gaſes are bodies combined with large doſes of caloric; and that if this could be withdrawn from them, they would all return to the ſtate of liquid, or of ſolid bodies. There are gaſes which can be rendered liquid, or ſolid, by compreſſion; others by chemical combination; and others by reducing their temperature; but in theſe caſes the caloric emitted does not always correſpond with what we would deem neceſſary to keep the bodies in an elaſtic ſtate. We are therefore inclined to think that ſome other cauſe beſides combination with caloric muſt be ſought, in order to account for the elaſticity of gaſeous bodies. We formerly obſerved that all matter attracts matter; but when the atoms of certain bodies are placed at a certain diſtance from each other, whether by the action of caloric, or any other cauſe, they ſeem to repel each other. Whether the bulk be diminiſhed by cooling, or by mechanical compreſſion, the atoms are brought nearer to each other; and if brought within the ſphere of the attraction of coheſion, they paſs into the ſtate of liquid or of ſolid bodies. In order to make gaſes change their ſtate, it only ſeems neceſſary therefore to bring their particles ſufficiently near to each other.

(507.) Some gaſes, ſuch as thoſe of which the atmoſphere is compoſed, have never been found in a liquid or ſolid form, except when they are chemically combined with other bodies. Though air be powerfully compreſſed by condenſing engines, it ſtill retains its elaſtic ſtate, and its reaction is directly as the force of compreſſion. Thus two meaſures of air compreſſed into a veſſel reacts with double the force of one meaſure; and ſo on of any greater quantity. Upon this principle the air-gun is conſtructed, bellows, and the machinery of blaſt furnaces. On the other hand, if air, or any of the gaſes, be rarefied to any degree, the portion of gas which is left in the veſſel ſtill continues to occupy the whole. Thus air-pumps may rarify more than 300 times, or ſo as to leave in the receiver only $\frac{1}{300}$th part of the air which originally filled it. But this remainder of air will expand ſo as to fill the whole veſſel, ſo that no point can be aſſigned which is not occupied by aerial particles. To this expanſive, or elaſtic power of the gaſes, no limits have been diſcovered; and Sir Iſaac Newton calculated that were the power of gravity ſuſpended, which attracts the atmoſphere to the earth, a cubic foot of air would expand ſo as to fill a ſphere equal in diameter to the Moon's orbit. As the reacting force of the gaſes increaſes in proportion as the particles are brought near to each other, ſo it diminiſhes as they recede. Thus in the receiver of an air-pump, which is rarified 300 times, the elaſtic, or reacting force of the air which is left, is hardly $\frac{1}{300}$th of the whole.

(508.) All the gaſes yet diſcovered may be reduced to the following, of which ſome are ſimple, others are compound.

I. Sim-

I. Simple Gases.

1. Oxygen.
2. Hydrogen.
3. Azote.
4. Muriatic acid.
5. Fluoric acid.

II. Compound Gases.

1. *Oxygen and a ſolid baſe.*

6. Carbonic oxide.
7. Carbonic acid.
8. Sulphurous acid.

2. *Hydrogen and a ſolid baſe.*

9. Carbureted hydrogen.
10. Olefiant gas.
11. Phoſphureted hydrogen.
12. Sulphureted hydrogen.
13. Arſenical hydrogen.

3. *Triple or quadruple compounds.*

14. Pruſſic acid.
15. Vapour of ether.
16. Vapour of alcohol.

4. *Simple gaſes combined.*

17. Steam.
18. Nitrous oxide.
19. Nitrous gas.
20. Nitric acid.
21. Ammonia.
22. Oxymuriatic acid.
23. Hyperoxymuriatic acid.

(509.) Some of theſe will fall to be conſidered under their *baſes*, and others under the *acids*, or the claſs to which they belong.

Sect. I. *Of* Oxygen.

(510.) Oxygen gas is commonly ſuppoſed to be ſome unknown ſubſtance, in combination with caloric, or latent heat. But as this ſubſtance has never been diſcovered in a ſeparate ſtate, the gas is treated as a ſimple ſubſtance. This gas was firſt diſcovered by Dr Prieſtley in 1774, who gave it the name of *dephlogiſticated air*. It was afterwards called highly *reſpirable air;* and Scheele, who diſcovered it in 1775, gave it the name of *empyreal air*. Condorcet and others gave it the name of *vital air;* and Lavoiſier, when he improved the nomenclature of chemiſtry, aſſigned it the name of *oxygen gas*. For the diſcovery of this ſubſtance we are wholly indebted to modern chemiſtry; and as it is of moſt extenſive influence, not only in the operations of chemiſtry, but alſo in thoſe of nature and the arts, its nature and properties may well deſerve a very full diſcuſſion.

(511.) In order to procure this ſubſtance, a retort of iron, or of glas coated with clay, or of glazed earthen ware, or porcelain, muſt be uſed. To the neck of this retort, after the ſubſtance from which the gas is to be extracted is put into it, a bent tube is adapted, and cloſely luted. The bent tube paſſes over the edge of the pneumatic trough, and terminates below a ſhelf on which is placed a glaſs jar previouſly filled with water. After the gas begins to riſe, as much ſhould be allowed to eſcape as will fully compenſate for the air in the veſſels; after which the mouth of the bent tube being put under the jar in the trough, the oxygen gas will ariſe in bubbles, and diſplace the water in the jar, and occupy its place. In this jar it may be kept for uſe, and transferred to other veſſels for any purpoſe wanted.

(512.) 1. Into the iron retort put a quantity of manganeſe in powder, and having luted on the bent tube, put the retort into a furnace or into a naked fire, and having placed the end of the bent tube under the jar in the pneumatic trough, the oxygen gas will riſe very copiouſly when the retort begins to get red hot.

(513.) 2. In a coated glaſs, or glazed earthen retort, a quantity of the black powder of manganeſe may be put, which has as much ſtrong ſulphuric acid added to it, as is ſufficient to form the whole into a paſte. This preparation yields oxygen gas, which ſhould be collected in the ſame way as the former: only to make the gas riſe from the manganeſe, it is not neceſſary to apply ſo much heat to the retort in this as in the former caſe. The reaſon aſſigned by chemiſts is, that the ſulphuric acid, by combining with the manganeſe, paſſes into the ſtate of a ſolid body, and gives out its caloric of fluidity to the oxygen, which cauſes it to aſſume its aerial or elaſtic form. We have already expreſſed doubts whether this be a true account of the matter; but when ſulphuric acid is uſed, the retort muſt not be of iron, or any ſubſtance on which the acid would act. A leaden retort would anſwer.

(514.) 3. Oxygen may alſo be obtained from *red oxide of mercury*, heated in a coated glaſs, or glazed earthen retort.

(515.) 4. It may alſo be obtained from the ſalt called *nitre*, or *ſaltpetre*, when heated red hot in a retort, and treated as already directed. A gun-barrel, whoſe touch hole is cloſely plugged up, may ſerve as a retort for this ſalt, or for the black oxide of manganeſe. A gun-barrel, whoſe breech is ſawed off, may ſerve as an intermediate tube, to convey the gas from the retort in the furnace, to the crooked tube which conveys it under the jar in the pneumatic trough. Although nitre does not yield oxygen ſo copiouſly as the other materials, what it yields is of greater purity: becauſe a portion of manganeſe, or of ſulphurous or other gaſes, always goes over with the oxygen from the other materials.

(516.) The jars, after being filled with the gas, may be removed from the pneumatic trough, by clapping under them a flat diſh filled with water, on which they may be carried where wanted, and allowed to ſtand any length of time. The water in the diſh will prevent communication between the atmoſpheric air, and the oxygen in the jar. Or portions of the oxygen may be transferred to other veſſels, a phial for inſtance, by previouſly filling the phial with water, and holding it above the ſurface of the water in the pneumatic trough, with one hand, while with the other the jar of oxygen is ſunk below the mouth of the phial, and turned ſo that bubbles of gas may riſe from the upper edge of the jar into the mouth of the phial, ſo as to diſplace the water, and fill it. If the mouth of the phial be ſo narrow that the bubbles of gas are apt to paſs by, without entering it, a ſmall funnel inſerted in it will conduct them upwards into the phial. When the jar is in the form of a bell, and has a ſmall braſs cape and ſtop-cock on its top, the gas may be taken out at top, by opening the ſtop-cock, and ſinking the bell down in the deep part of the pneumatic trough, beſide the ſhelf. Theſe obſervations apply to the management of all gaſes as well as oxygen; only ſome of them require a pneumatic trough filled with mercury, in place of water.

(517.) The oxygen gas, thus obtained, is a colourleſs tranſparent aerial fluid, reſembling atmoſpheric air. It is ſuppoſed to conſiſt of an unknown baſe, which had previouſly been united with the manganeſe, or with the mercury, but which combination with caloric has cauſed to aſſume the elaſtic, or aerial form. But as this baſe has never been exhibited in a ſeparate ſtate, it is claſſed as a ſimple ſubſtance. It poſſeſſes neither taſte nor ſmell; and its ſpecific gravity, according to Mr Kirwan, is to that of water, as 0·00135 to 1·0000. Being 740 times lighter than its bulk of water, its weight is to that of atmoſpheric air as 1103 to 1000; or 100 cubic inches of oxygen gas weigh 34 grains, while the ſame meaſure of atmoſpheric air weighs only 31 grains, at the temperature of 60°, and the barometer being at 30 inches. From Mr Davy's experiments it appears that 100 cubic inches of oxygen gas weigh 35·05 grains.

(518.) Oxygen gas does not form any ſenſible combination with water, unleſs it be ſubjected to ſtrong preſſure, when the water combines with, and retains in ſolution, half its bulk of the gas. Water thus impregnated does not ſenſibly differ from other water either in ſmell or taſte; but is ſaid to have been adminiſtered with good effect in certain diſeaſes. It would appear that common water has a portion of oxygen gas in union with it, to which its wholeſomeneſs as drink may perhaps be aſcribed; for cattle ſoon die when they have no other drink in winter but melted ſnow, which contains no oxygen gas. Perhaps the evil might be prevented by infuſing hay, or odoriferous herbs in the water. The Chineſe are ſaid to be under the neceſſity of boiling their water, to make it depoſit its mud; and this circumſtance led them to infuſe it with tea, which ſupplies a ſtimulus to compenſate for the oxygen gas that had been expelled by the boiling.

(519.) Combuſtible bodies burn with incomparably greater ſplendour in oxygen gas than in common air, and oxygen gas ſupports combuſtion much longer than an equal quantity of common air. Indeed it is owing to a mixture of oxygen gas in atmoſpheric air that it ſupports combuſtion at all; for when air is deprived of oxygen gas, it extinguiſhes burning bodies more effectually than if they were plunged into water. If a burning wax taper be blown out, leaving part of the wick red, and be plunged into oxygen gas, it ſuddenly rekindles with a ſlight exploſion, and burns with uncommon brilliancy. Many bodies are combuſtible in oxygen gas, which are hardly ſo in common air. Thus if a ſlender iron wire be twiſted round a cylinder, ſo as to form it into a ſpiral ſcrew, have its end heated red hot, and be plunged into a phial of oxygen gas, it burns with great brilliancy, and throws out luminous ſparks in all directions, which are found to be the iron converted into oxide, or even liquified into glaſs. If the wire be tipped with a very ſmall bit of phoſphorus, it kindles of itſelf when plunged into the gas, and burns as before.

(520.) Oxygen gas is eſſentially neceſſary for the reſpiration of animals. No animal can live in any kind of air unleſs it contain a proportion of oxygen gas. The only exceptions to this obſervation are ſome ſpecies of inſects, which hatch in putrid ponds. Theſe, like vegetables, inſpire noxious gaſes, and emit oxygen gas. But all land animals and fiſhes, without exception, which are warmer than the medium in which they reſide, require a portion of oxygen gas to ſupport life. Dr Prieſtley and Count Morozzo eſtabliſhed this fact by the moſt convincing experiments. Into a veſſel filled with common air, and inverted over water, ſparrows were introduced in ſucceſſion, and the effects attentively obſerved.

	H.	M.
The firſt ſparrow lived	3	0
The ſecond — —	0	3
The third — —	0	1

The ſame veſſel being filled with oxygen gas, the following reſults were obtained.

	H.	M.
The firſt ſparrow lived	5	23
The ſecond — —	2	10
The third — —	1	30
The fourth — —	1	10
The fifth — —	0	30
The ſixth — —	0	47
The ſeventh — —	0	27
The eighth — —	0	30
The ninth — —	0	22
The tenth — —	0	21

Two ſparrows being then put in together, the one lived an hour, but the other died in about 20 minutes. Theſe experiments prove not only the indiſpenſible neceſſity of oxygen gas for the reſpiration of animals; but alſo that it is capable of ſupporting reſpiration, as well as combuſtion, much longer than common air.

(521.) Oxygen combines with a great variety of bodies, and forms with them compounds whoſe properties are very different from thoſe of the ſeparate bodies. Combined with metals, it deſtroys the malleability of the latter, and the compounds are brittle earthy ſubſtances, formerly called calces; but to which the name of *oxides* is now applied. When combined with other bodies, and with ſome of the metals in ſufficient proportion, the taſte of the compound becomes ſour or acid. Becauſe this is the moſt frequent conſequence of combining this gas with bodies, Lavoiſier gave it the name of *oxygen*, or *acidifying*, meaning thereby the ſubſtance whoſe combination changes bodies into acids. The ſeeds of plants abſorb oxygen during their germination; but when the plants have thrown out leaves, they emit oxygen gas very copiouſly during the day, or while expoſed to light. By means of vegetation the oxygen which is conſumed by reſpiration and combuſtion is replaced, and the balance of its proportion to the other atmoſpheric gaſes is preſerved. Without the operation of vegetation all fires would ſoon be extinguiſhed, and all animals would die.

(522.) The following is the order of the affinity of oxygen with various ſubſtances, with which it is known to combine.

OXYGEN.
Charcoal,
Titanium,
Manganeſe,
Zinc,
Iron,
Tin,

Uranium,
Molybdena,
Tungſten,
Cobalt,
Antimony,
Hydrogen,
Phoſphorus,
Sulphur,
Azote,
Nickel,
Arſenic,
Chromium,
Biſmuth,
Lead,
Copper,
Tellurium,
Platina,
Mercury,
Silver,
Oxide of arſenic,
Nitrous gas,
Gold,
Muriatic acid,
White oxide of manganeſe,
White oxide of lead.

Sect. II. *Of* Hydrogen Gas.

(523.) Hydrogen gas is a tranſparent, elaſtic, aërial fluid, of much leſs ſpecific gravity than atmoſpheric air, and hence is commonly uſed for filling balloons. It is an inflammable ſubſtance, and is commonly reckoned a ſimple or elementary body; though, if the received theory concerning the conſtitution of gaſeous bodies be true, of which we have often expreſſed our doubts, it muſt, like oxygen, be a compound of caloric with ſome unknown baſis. Being highly inflammable, it was formerly known under the name of *inflammable air*; and ſome chemiſts gave it the name of *phlogiſton*. As the union of a certain portion of oxygen with this gas, by means of combuſtion, produces water. Lavoiſier gave it the name of *hydrogen*, or the baſis of water.

(524.) To procure hydrogen gas, a common retort may be uſed, into which is put a quantity of iron filings, and on the filings is poured thro' a glaſs funnel two parts of ſulphuric acid that had been previouſly diluted with four times its bulk of water. A violent efferveſcence enſues, and the point of the retort being held under water until the gas has expelled all the air formerly in the veſſel, it may be placed below a jar in the pneumatic trough, previouſly filled with water; the hydrogen gas will riſe in copious bubbles, diſplace the water, and fill the jar. Sometimes a phial is uſed, into whoſe neck a bent tube is inſerted, ground with emery. The filings and acid being put into the phial, the bent tube is inſerted, and made tight; and its extremity being ſunk under water until all the air is expelled, the gas is then collected in jars placed on the ſhelf of the pneumatic trough, as before.

(525.) Hydrogen gas may alſo be procured in great abundance by cauſing the ſteam of water to pas thro' a gun-barrel that is heated red-hot by being laid acroſs a ſmall furnace, or craddle grate, filled with burning coals. A glazed earthen or porcelain tube anſwers beſt for this purpoſe, and it ſhould be filled with refuſe of iron wire, or with the borings of iron guns. A bent tube is inſerted in the oppoſite extremity of the earthen tube, and conveys the gas under the jars placed in the pneumatic trough. In this caſe the water is decompoſed; its oxygen combining with iron, while its hydrogen aſſumes its elaſtic, or gaſeous form.

(526.) Hydrogen gas was long known to miners, and was the cauſe of much terror to them, under the names of *wild fire*, and *fire damp*. Not many years ago a great quantity of this gas was raſhly exploded in a coal-pit at Cambuſlang, near Glaſgow which killed ſome of the miners and ſcorched others; ſhook the earth all around; cauſed the pit to cloſe; and blew away the horſe-gin, and other machinery at the mouth of the pit, ſo that no fragment of them was ever found. At Newcaſtle, and other coal-diſtricts, they have a tall conical building, like a glaſs-houſe furnace, built around the mouth of a pit which is ſunk towards the riſe of the coal-ſtratum. This building is entered by 3 or 4 doors, whoſe junctions are lined with cloth, and are opened and ſhut in ſucceſſion, ſo that no air can get into the building but what riſes up thro' the pit. A powerful fire is conſtantly kept up in this building, which cauſes a ſtrong draught of air to riſe up thro' the pit, and to convey along with it the hydrogen gas, which being lighter than common air always riſes upwards. Atmoſpheric air is admitted by the pits which are ſunk towards the dip, or inclination of the coal ſtratum; and thus their mines are ventilated by a conſtant ſucceſſion of freſh air, while the hydrogen gas is drawn off.—Hydrogen gas is ſuppoſed to be generated in mines from the decompoſition of water by means of pyrites, or of coal.

(527.) Mayow, Boyle, and Hales made ſeveral experiments upon this ſubſtance; and its combuſtibility was known about the beginning of the 17th century, and was often exhibited by ſhowmen. But for any diſtinct knowledge of its nature and properties, we are indebted to Mr Cavendiſh; whoſe inveſtigations were followed out by Prieſtley, Scheele, and Volta.

(528.) This gas, like atmoſpheric air, is ſuſceptible of indefinite dilatation and compreſſion; and the moſt probable method for ſupporting a long aërial voyage in balloons, would be to have great quantities of the gas condenſed in globes of copper, to be carried as ballaſt in the car. When the gas in the balloon began to be too much exhauſted, the waſte might be occaſionally ſupplied by opening a ſtop-cock in one of theſe globes; and after all the globes were emptied of condenſed gas, the balloon might ſtill be kept afloat by throwing them out from time to time. In this way a balloon might be kept afloat a ſufficient time to enable an aëronaut to traverſe the ocean.

(529.) The hydrogen gas which is produced from diluted ſulphuric acid acting on iron, has a peculiar ſmell ſimilar to that which is produced by flints rubbing on each other. This muſt be aſcribed to ſome impurity united with the gas; for the gas produced by ſteam paſſing thro' tubes filled with red hot iron, has no ſmell. The latter is alſo of leſs ſpecific gravity than the former, and is hence beſt adapted for filling balloons.

(530.) This is the lighteſt of all the gaſeous bodies

dies yet known. The ſpecific gravity of common air being reckoned 1·000, that of hydrogen gas, according to Mr Kirwan, will be 0·0843. According to Lavoiſier it is only 0·0756; while Meſſrs Fourcroy, Vauquelin, and Seguin, make it 0·0887. Theſe diſcrepancies are probably owing to different degrees of purity of the gas on which they operated; and we have already ſtated that what is obtained from ſteam is lighter and more pure, than that which is obtained from ſulphuric acid acting upon iron. But Mr Kirwan's eſtimate is moſt likely to be correct. At the temperature of 60°, and the barometer ſtanding at 30 inches. According to Kirwan, 100 cubic inches of this gas weigh 2·613 grains Troy; according to Lavoiſier, 2·372 grains; and according to Fourcroy, Vauquelin, and Seguin 2·75 grains. Thus hydrogen gas is nearly 12 times lighter than common air; and ſome eſtimate that which is obtained from ſteam paſſed over hot iron in a tube, to be 13 times lighter than common air.—The lightneſs of this gas accounts for its buoyancy, in raiſing balloons to the higher regions of the atmoſphere.

(531.) If a lighted taper, or any burning body, be immerſed in this gas, it is inſtantly extinguiſhed. Hence it is not a ſupporter of combuſtion.

(532.) Tho' it does not inſtantly extinguiſh animal life, it is not capable of ſupporting reſpiration any length of time. Dr Gilby of Birmingham found a mouſe lived in it 30 ſeconds, without apparent inconvenience; but in one minute and thirty two ſeconds it was dead. Dr Beddoes kept a rabbit in it 7 minutes, and tho' it was much diſtreſſed, it recovered. Toads, and ſome animals of that ſort, can live in it a very long time; but in ſuch ſituations there is reaſon to ſuſpect that they revert to their dormant, or lethargic ſtate.

(533.) Scheele could make 20 inſpirations of it without much inconvenience. This Fontana aſcribed to common air previouſly contained in the lungs, for after emptying his lungs as much as poſſible, he could only make three reſpirations of this gas, and theſe accompanied with extreme feebleneſs and oppreſſion about the cheſt. There is, however, reaſon to ſuſpect that the gas he breathed was carbureted hydrogen, which is very deleterious; for Pilatre de Roſier, and Mr Watt, confirmed what had been advanced by Scheele. The former, to prove it was real hydrogen gas he took into his lungs, put a pipe into his mouth, and on applying a lighted taper to its extremity when he was blowing it out, the gas burnt with a bright flame. To prove that the reſpiration was not ſupported by common air previouſly in his lungs, he mixed one part of common air with nine of hydrogen gas, and having drawn it into his lungs, he applied a taper to burn it as before. But it exploded violently in his mouth, producing a painful ſenſation as if all his teeth had been knocked out. The common air, in this caſe, had not been acted upon by the lungs, or it would not have ſupported the combuſtion of the hydrogen gas. Mr Davy, of the Royal Inſtitution, when his lungs were previouſly much exhauſted of common air, could not breathe this gas above half a minute, without loſs of muſcular power, and feeling a ſort of giddineſs. But when his lungs were not previouſly emptied, he could breathe this gas about a minute without feeling much uneaſineſs.—Hydrogen, therefore, can hardly be reckoned a reſpirable gas: tho' when much diluted with common air it may be breathed without injury.

(534.) Dr Thomſon eſtimates the igniting point of this gas at 1000°. If a phial be filled with it, and a lighted taper applied to its mouth, it burns ſlowly, with a yellowiſh white flame, if it be pure. But if the gas hold other ſubſtances in ſolution, the colour of the flame varies according to the ſubſtance; tho' it is commonly reddiſh. It may alſo be ſet on fire by a red hot iron, or by the electric ſpark; but not by ſparks ſtruck from flints by ſteel. Hence, in ſome mines, where they are afraid of producing exploſions of this gas, inſtead of candles, they produce light by means of a ratchet wheel of ſteel, which being turned rapidly round, ſtrikes fire by ſcratching flints fixed, in the rim of another wheel.

(535.) If pure oxygen and hydrogen gas be mixed together, no effect enſues. But if an electric ſpark, or a lighted taper be applied to the mixture, it explodes with great violence. If one meaſure of pure oxygen gas, and 2·05 meaſures, or bulks, of pure hydrogen gas, be introduced into a jar in the pneumatic trough, over water, and exploded by the electric ſpark, after the exploſion, the water ſuddenly riſes and fills the whole jar. This diſcovery we owe to Mr Scheele; but it was followed out by Mr Cavendiſh with all the accuracy which diſtinguiſhes his chemical reſearches. He exploded theſe mixtures in dry glaſs veſſels, having previouſly dried the gaſes with the utmoſt care, and always found that, after the exploſion, a quantity of water was left in the veſſels, exactly equal in weight to that of the oxygen and hydrogen gaſes exploded. The gaſes wholly diſappearing during the exploſion, and water being left in the form of ſteam, which ſoon condenſed and formed drops on the ſides of veſſels, Mr Cavendiſh concluded that water is compounded of oxygen and hydrogen, united in the proportion of $85\frac{2}{3}$ parts by weight of oxygen, with $14\frac{1}{3}$ of hydrogen. This concluſion was afterwards more fully confirmed by the experiments of Lavoiſier and his friends.

(535.) If a large bladder be filled with hydrogen gas, and a pin-hole made in the end of the bladder, thro' which the gas is preſſed in a conſtant ſtream, it will burn like a candle on applying a lighted taper to the ſtream. If it be burnt under a cold glaſs bell, its ſurface will ſoon be coated with drops of water. If the bladder be hung up for ſome time, the atmoſpheric air will enter and mix with the gas; or if it has the proper proportion of oxygen gas mixed with it, on applying fire the whole will ſuddenly explode. This is the ſafeſt way of exploding this gas, becauſe the fragments of the bladder, when thrown about, can hurt nothing.

(537.) Hydrogen gas, like other combuſtible bodies, does not burn unleſs it be in contact with oxygen gas. It requires 9 meaſures of common air, at an average, to burn, or explode 4 meaſures of hydrogen gas, and 7 meaſures remain after the combuſtion. The hydrogen and the oxygen of the atmoſpheric air are converted into water; while the 7 meaſures of gas that remain unchanged, ed, are the part of the atmoſphere which is not oxygen. When the exploſion is made by means of the electric ſpark, in a tube of glaſs which is accurately graduated and cloſe at one end, the purity both of the hydrogen gas, and of the atmoſpheric air, may be aſcertained. The more the bulk is diminiſhed the more pure is the hydrogen gas, and the greater the proportion of oxygen in the atmoſpheric air that is ſubjected to trial. This inſtrument is commonly called *Voltas eudiometer*.

(538.) Hydrogen gas explodes not only in conſequence of being ſet on fire, but alſo in conſequence of being powerfully compreſſed, when mixed with a due proportion either of oxygen gas, or of atmoſpheric air. Biot having compreſſed a mixture of oxygen and hydrogen gaſes, by means of a piſton, in the barrel of an air-gun, the mixture exploded and burſt the barrel, tho' made of iron, and very ſtrong.

(539.) Hydrogen gas is not ſenſibly altered by being kept over water; nor does it combine with water, unleſs the water has had its air expelled by boiling, when 100 cubic inches of the water abſorb 1·53 inches of hydrogen gas, at the temperature of 60°. Mr Paul found that by artificial preſſure water may be made to abſorb about a third part of its bulk of this gas. The taſte of the water is not altered, and he recommends it in inflammatory fevers and nervous complaints; but thinks it injurious in caſes of dropſy.

Of WATER.

(540.) The only compound that has yet been formed from the union of oxygen and hydrogen, is water; and theſe two gaſes never unite in any but one proportion, ſuch as has been already explained. As water was univerſally eſteemed an elementary body, until of late years, and its compoſition may be regarded as one of the greateſt diſcoveries of modern chemiſtry, it may be neceſſary to enter into a ſhort review of the evidence by which it is ſupported. This evidence is complete in all its parts, conſiſting of analyſis, illuſtrated and confirmed by ſyntheſis.

(541.) The merit of this diſcovery is wholly due to the Britiſh philoſophers, tho' Lavoiſier illuſtrated and confirmed it in a more ſatisfactory manner, and with greater accuracy in the details, than had been done before him. We already noticed the experiments of Mr Cavendiſh, who formed water by combining the oxygen and hydrogen gas in certain proportions. We alſo noticed the ſagacity of Newton, who, from the circumſtance of water refracting the rays of light more powerfully than other uninflammable ſubſtances, of the ſame denſity, pronounced water to contain an inflammable ingredient in its compoſition. Theſe circumſtances led various chemiſts to try if they could effect the decompoſition of water. Certain members of the Chemical Society at Glaſgow, pupils of the late Dr Irvine, after trying many expedients for this purpoſe, with doubtful ſucceſs, deciſively effected the object by paſſing the ſteam of water thro' red hot tubes of glazed porcelain, were filled with the parings of ſheet iron, and wire rolled into ſpiral forms. So ſucceſsful were their experiments that Dr Irvine acknowleged the decompoſition of water to be completely eſtabliſhed, and admitted the doctrine of phlogiſton to be wholly overturned. It was long ſuppoſed that the union of oxygen and hydrogen gaſes would produce ſulphuric acid, and in following out this idea conſiderable progreſs had been made in detecting the compoſition of water, ſo early as 1776 by the celebrated Macquer, and afterwards by Mr Warltire, Dr Prieſtley, and others. Mr Watt had alſo drawn the proper concluſion concerning the compoſition of water, before Mr Cavendiſh made the very ſatisfactory experiments already alluded to, in 1781.

(542.) Lavoiſier had long ſuppoſed that the combination of oxygen and hydrogen gaſes, would form carbonic acid, or the ſulphurous or ſulphuric acids. But having made ſome experiments the reſult of which ſurpriſed him, he contrived an apparatus with great art, and inſtituted a ſet of experiments which might obviate all the objections that had been made to the decompoſition of water throughout Europe, and might lay the controverſy at reſt.

(543.) Having prepared tubes of glazed porcelain, or of coated glaſs, into one of theſe was put 28 grains of pure charcoal, in ſmall fragments, which had been heated red hot in a cloſe veſſel, to expel any moiſture which might adhere to it. The tube being placed acroſs a ſmall furnace, and ſupported by a bar of iron to prevent it from bending, was heated red hot, by being ſurrounded with burning coals. Into one end of the tube was tightly luted a ſmall glaſs retort, containing a certain weight of pure diſtilled water, which was made to boil, and its ſteam to paſs through the tube in the furnace, by means of a lamp, or of a ſmall furnace placed below it, filled with burning charcoal. To the other end of the ignited tube, was luted another tube, which paſſed down through a veſſel filled with cold water, in a ſpiral form, exactly ſimilar to the worm uſed in diſtillation. The uſe of this worm was to condenſe, and reduce back into water, that part of the ſteam which might paſs through the ignited tube without being decompoſed. The worm terminated in a glaſs bottle with a double neck, into one of which it was inſerted, and luted. In this bottle the water that came over was collected; while a bent tube inſerted in the other neck of the bottle, conveyed the gas, or incondenſible product into a pneumatic trough, where it was received in jars over mercury.

(544.) The apparatus being thus diſpoſed, after all the water was evaporated from the retort, and paſſed through the red hot tube, the charcoal in this tube was found to have diſappeared. The water collected in the double necked bottle into which the extremity of the worm was inſerted, was found to have loſt 85·7 grains of its original weight; and the gas collected in the glaſs jars in the pneumatic troughs, was found to weigh 113·7 grains, which is equal to the weight the water had loſt, together with the 28 grains of charcoal that had diſappeared. The gas, when examined, was found to be of two kinds, namely, 144 cubical inches of carbonic acid gas weighing 100 grains, and 380 cubical inches of inflammable gas weighing only 13·7 grains. It is known that 100 grains of carbonic acid gas conſiſts of 72 grains of oxygen gas, combined with 28 grains of carbon. The carbonic acid gas muſt therefore have been formed from 72 grains of oxygen in the compoſition of the water, combining with the 28 grains of charcoal in the ignited tube which diſappeared. Hence the 85·7 grains of water which were decompoſed during the experiment, muſt have been compoſed of 72 grains of oxygen united with 13·7 grains of inflammable gas.

(545.) Every thing being arranged as in the laſt experiment, in place of charcoal, 274 grains of ſoft iron, in thin plates, rolled up ſpirally, were put into the ignited tube, and the ſteam of water made to paſs through the tube, while red hot, as before. After all the water was evaporated from the ſmall retort, what was collected in the glaſs bottle at the extremity of the worm, was found to have loſt 100 grains of its original weight. But in the jars in the pneumatic trough, there were collected 15 grains of light inflammable gas, and the iron had gained 85 grains of additional weight, which united make up the 100 grains of weight the water had loſt. The iron was found to have loſt its metallic properties, and to have been converted into an oxide, or calx, in the ſame way as if it had been burnt in oxygen gas. Hence we have an additional proof that 100 grains of water are compoſed of 85 grains of oxygen, and 15 of light inflammable gas.

(546.) Thus Lavoiſier eſtabliſhed the compoſition of water by the moſt correct and ſatisfactory analyſis. But not ſatisfied with this, he tried alſo to eſtabliſh the fact by ſyntheſis, judging that if he could produce water by reuniting its component ingredients in the proportions indicated by analyſis, the evidence would be complete, and incontrovertible. The experiments of Mr Cavendiſh, who had produced water by combining the oxygen and hydrogen gaſes, were formerly noticed; but Lavoiſier aimed at obviating all the objections which had been made to his experiments, and at removing all doubts which might be entertained upon the ſubject.

(547.) For this purpoſe he prepared a large balloon of cryſtal glaſs, containing about 30 pints, with a broad neck, on which was cemented a cap of copper. Through this cap, there paſſed into the balloon 3 metallic pipes, furniſhed with ſtopcocks; one of which being attached to an air-pump, rarefied the balloon of its air; the other conveyed oxygen gas, and the third hydrogen gas into the balloon, from ſeparate reſervoirs where theſe gaſes were prepared and purified. Through the cap there alſo paſſed a wire into the balloon, bent at its interior extremity, and furniſhed with a knob, which being brought near the mouth of the pipe that conveyed the hydrogen gas, imparted an electrical ſpark, or ſhock, to ſet it on fire.

(548.) The apparatus being thus prepared, the balloon was exhauſted of air by means of the pipe firſt mentioned, and cloſed by the ſtop-cock. It was then filled with purified oxygen gas from the reſervoir; and the pipe which conveyed it cloſed by its ſtop-cock. Laſtly a ſtream of purified hydrogen gas was made to flow into the balloon, from the reſervoir where it was prepared, which being ſet on fire by the electric ſpark, conveyed through the wire already deſcribed, produced a conſtant flame, until all the oxygen gas in the balloon was combined with hydrogen gas. The ſides of the balloon were ſoon obſcured by a dewy vapour, which trickling down collected into water at its bottom. Thus by occaſionally exhauſting the balloon; filling it with freſh oxygen gas; and burning in it additional quantities of hydrogen gas, water was formed in conſiderable quantities. It was found that the weight of the water formed, was preciſely equal to that of the gaſes conſumed. It required about two parts in bulk of hydrogen gas, combined with one of oxygen gas, in order to form water: or 85 parts by weight of oxygen gas, combined with 15 parts of hydrogen gas, produced 100 parts of water.

(549.) Thus was the compoſition of water, which had firſt been diſcovered by the Britiſh chemiſts, confirmed by Lavoiſier and his friends, both by the moſt exact analyſis and ſyntheſis.

(550.) It may be neceſſary to mention here, that the oxygen gas uſed in theſe experiments, was purified from ſulphurous and carbonic acid gaſes, by allowing it to reſt ſome time in contact with a weak ſolution of pure potaſh, which abſorbs theſe gaſes. If made from mangeneſe or oxide of mercury, by reſting, it alſo depoſits particles of the oxides which riſe with, and remain ſuſpended in it. The hydrogen gas was purified in the ſame way. When this gas is made from ſulphuric acid acting upon iron, particles of the iron riſe with it, which are depoſited by reſting. Both gaſes were purified from water, by paſſing through a tube on their way to the balloon, filled with dried ſalts which have a ſtrong attraction for water, ſuch as acetite of potaſh, (vinegar combined with potaſh,) muriate or nitrate of lime (the muriatic or nitric acids combined with lime), or the muriate of magneſia (the muriatic acid combined with magneſia). Theſe ſalts being previouſly dried by heat, were put into the tube in looſe fragments, ſo as not to obſtruct the paſſage of the gaſes; but from their ſtrong attraction for water, they would abſorb every particle of it which came in contact with them.

(551.) Water being thus proved to be a compound body, it is unneceſſary to add that it exiſts in the threefold ſtate, of a ſolid, a liquid, and an elaſtic body, or ſteam.

SECT. III. *Of* AZOTE.

(552.) THIS gas derives its name from its ſudden extinction of animal life when taken into the lungs, without any mixture of oxygen gas. But as it poſſeſſes this property in common with other gaſes, ſome chemiſts have given it the name of NITROGEN GAS.

(553.) This gas may be obtained by putting a quantity of iron filings mixed with ſulphur, and moiſtened with water, into a glaſs veſſel filled with common air. In a few days this preparation will have abſorbed all the oxygen gas. If phoſphorus be put in the glaſs veſſel, the abſorption of the oxygen will be completed in leſs than 24 hours. Berthollet pointed out a method of obtaining azotic gas in great purity. Very much diluted nitric acid, or *aqua fortis*, being poured upon a piece of muſcular fleſh, and kept at a heat of about 100°, yields this gas very copiouſly, which may be collected in veſſels in the pneumatic trough, as formerly deſcribed.

(554.) Dr Rutherford, Profeſſor of Botany at Edinburgh, firſt diſcovered this gas in 1772. Scheele obtained it by the firſt mentioned proceſs, and proved it to be a diſtinct fluid, in 1776. Lavoiſier aſcertained it to be a component part of atmoſpheric air in 1773. He analyſed atmoſpheric air, and found it to conſiſt of 78 parts of 100 in bulk, of this gas, and the remainder to be chiefly oxygen gas.

(555.) This gas is a tranſparent, colourleſs, elaſtic fluid, like common air; and has no ſmell. According to Kirwan, its ſpecific gravity is 0·985, that of our air being 1·000; but Lavoiſier and Davy make it only 0·978. The temperature being 60°, and the barometer 30 inches in height, according to Kirwan 100 cubic inches of it weigh 30·535 grains, and according to Lavoiſier and Davy 30·338 grains.

(556.) If breathed by animals, it kills them almoſt inſtantly, and no combuſtible body will burn in it. Hence candles are extinguiſhed in a veſſel containing air, immediately after all the oxygenous part is conſumed. Mr Goettling indeed aſſerted that phoſphorus ſhone, and was converted into acid, in pure azotic gas. But the experiments of Drs Scherer and Iaeger, confirmed by Profeſſors Lampadius and Hildebrandt, prove that this is not the caſe, and that his azote muſt have contained a portion of oxygen.

(557.) This gas is not ſenſibly abſorbed by water, though Mr Henry aſcertained that if water be previouſly deprived of all its air, 100 inches of it, at the temperature of 60°, abſorbed 1·47 inches of azotic gas.

Nitric Acid.

(558.) Dr Prieſtley aſcertained that if electric ſparks be repeatedly made to paſs through atmoſpheric air, or a mixture of the azotic and oxygen gaſes, confined in a graduated glaſs tube, the volume or bulk of the air is diminiſhed, and at the ſame time the blue infuſion of litmus being admitted into the tube, acquires a red colour; ſhewing that an acid has been generated. Mr Cavendiſh tried theſe experiments with all the accuracy which diſtinguiſhes his philoſophical inveſtigations, along with Mr Gilpin, and a committee of the Royal Society; and aſcertained that the electric ſpark cauſes theſe two gaſes to enter into chemical union, and that when united they form Nitric acid. The reſult of his experiments is that there enters into the compoſition of 100 parts of nitric acid,

29·77	azote,
70·23	oxygen.
100·00	

This reſult differs very little from that of Mr Davy, who repeated theſe experiments with much attention, and ſtated the conſtituents of nitric acid to be

29·5	azote,
70·5	oxygen.
100·0	

Thus nitric acid is aſcertained to be a compound of azote and oxygen. It is a heavy liquid, ſometimes limpid, but uſually of a yellow colour, or inclining to green. It acts powerfully on various ſubſtances, and chiefly from the facility with which it parts with a portion of its oxygen. But its properties will be more fully detailed when we come to treat of the acids.

Nitrous Gas.

(559.) Phoſphorus and ſulphur undergo the phenomena of combuſtion when put into nitric acid. They attract a portion of oxygen, and are themſelves converted into acids. The nitric acid is partially decompoſed, and its azote, in union with a portion of oxygen, aſſumes the elaſtic or gaſeous form, and is called nitrous gas; which may be collected in jars in the pneumatic trough, in the way formerly deſcribed. The ſame gas may be obtained, in great abundance and purity, by diſſolving copper or ſilver in nitric acid.

(560.) This gas is colourleſs, elaſtic, and compreſſible, like other gaſes. But if a portion of oxygen, or of atmoſpheric air be allowed to mix with it, it is ſuddenly changed into an orange or yellow vapour, with a ſlight increaſe of temperature, and is reconverted into nitric acid. In this caſe the azotic baſis reunites with that portion of oxygen which had been abſtracted during the decompoſition of the nitric acid. But the gas, though it contains a portion of oxygen in its compoſition, exhibits no acid properties, not having a ſufficient doſe of oxygen to convey thoſe properties. It is hence called an *oxide of azote*.

Gaseous Oxide,

(561.) Is only the preceding gas deprived of a greater portion of its oxygen, and is prepared by keeping iron filings ſome days in nitrous gas. In this caſe the iron abſorbs a greater portion of the oxygen than was abſtracted during the decompoſition of the nitrous acid, and leaves the gas in the ſtate of a more perfect oxide than it formerly was. It no longer becomes yellow, nor reverts back into the ſtate of nitric acid, when brought in contact with atmoſpheric air, or with oxygen gas. It is probable the electric ſpark would cauſe a new combination of oxygen with this gas, as it does with pure azote; though this has not been tried. But that this gas ſtill contains a portion of oxygen, appears from this circumſtance, that phoſphorus burns in it with great ſplendor, and is converted into phoſphoric acid.—By ſome it has been called *nitrous oxide*, and by others, *gaſeous oxide of azote*.

(562.) Thus it appears that azote is capable of combining with three doſes of oxygen; with the ſmalleſt doſe forming *nitrous*, or *gaſeous oxide*; with a higher doſe forming *nitrous gas*; and with the higheſt, or moſt exceſſive doſe forming *nitric acid*.

(563.) Azote alſo combines with ſome combuſtible bodies, and forms compound gaſes with peculiar properties. When combined with hydrogen, it forms

Volatile Alkali.

(564.) This ſubſtance, when pure, is always in the form of a gas, and Dr Auſtin aſcertained it to be compoſed of 80 parts by weight of azote, and

20 of hydrogen. This gas is obtained by diſtilling putrid wool, hair, horns, urine, and a variety of animal ſubſtances; but it may be obtained in greateſt purity by mixing ſal ammoniac with quicklime, in a retort, and apply a gentle heat. The gas muſt be received in jars over mercury, as it combines with water. This gas poſſeſſes the property of alkalies in changing blue vegetable colours into a green. When electric ſparks are paſſed through this gas, it expands to double its former bulk, and the hydrogen ſeparates from the azote.

(565.) Dr Auſtin obſerved that it is difficult to form this gas by mixing hydrogen and azote together, but that it readily forms when the hydrogen is in a naſcant ſtate. He put iron filings, moiſtened with water, into a jar filled with azote, over mercury, and in a few days a paper tinged with the blue of raddiſh, ſuſpended in the jar, was converted into green. The iron abſorbed the oxygen of the water, and the hydrogen being let looſe, at the inſtant of its diſengagement, combined with azote, forming volatile alkali, which changed the vegetable colour. To this cauſe we may aſcribe the copious formation of this gas in the putrefaction of animal, and of ſome vegetable ſubſtances. When nitrous gas had moiſtened iron immerſed in it, the formation of volatile alkali was more rapid than with pure azote.—We have frequently formed this gas by making ſmall bubbles of hydrogen gas to riſe into a wine decanter which had previouſly been filled with nitrous gas. This led us to ſuſpect that nitrous gas, and not pure azote, was the baſis of volatile alkali.—Moiſtened iron filings produce this gas in common air; but more ſlowly. Mr Kirwan found that when nitrous gas, and ſulphureted hydrogen are mixed together volatile alkaline gas is formed.

(566.) The alkaline properties of this gas will be more fully diſcuſſed when we come to treat of ALKALIES.

PHOSPHORETED AZOTIC GAS.

(567.) When phoſphorus is immerſed in azotic gas, a portion of it combines with the azote, and its bulk is enlarged about $\frac{1}{40}$th. This compound ſhines when mixed with atmoſpheric air; but when bubbles of it are let up into a jar filled with oxygen gas, it ſhines with great brilliancy. This is owing to the combuſtion of the phoſphorus held in ſolution by the azote, when it comes in contact with oxygen gas.

(568.) Azote is alſo thought to combine with carbon; but the properties of this compound have not been particularly examined.

(569.) Having thus explained all the known combinations of azote with other bodies, we may now obſerve that this is commonly eſteemed a ſimple ſubſtance. Dr Prieſtley gave it the name of *phlogiſticated air*, and ſuppoſed it to be formed during combuſtion by the combination of phlogiſton with air. When a body ceaſed to burn in a veſſel containing air, he ſuppoſed the air to be ſaturated with phlogiſton, and of courſe, being incapable of abſorbing any more from the burning body, the inflammation ceaſed. But it has already been explained, that during combuſtion, inſtead of phlogiſton combining with the air, a portion of the air, or the oxygenous part, combines with the burning body.

(570.) The nature, and decompoſition of azote has been the ſubject of much controverſy among chemiſts. At a ſubſequent period, Dr Prieſtley having moiſtened the inſide of earthen retorts with water, and expoſed them to diſtillation in a ſand bath, obtained air in place of water, as might have been expected. Theſe experiments were repeated and varied by different chemiſts; from which ſome concluded that azote was water with an under proportion of oxygen in its compoſition; others that it was water with a particular combination of caloric, or latent heat. But it was diſcovered that the water, uſed in theſe experiments, had exuded through the pores of the earthen veſſels; and that the air obtained by diſtillation had returned into the veſſels from the atmoſphere, or after being in contact with the fuel in which the earthen tubes were immerſed. When glaſs, or glazed veſſels were uſed, water, and not air, came over by diſtillation.

(571.) Though all attempts to decompoſe azote have hitherto failed, and we are under a neceſſity of claſſing it as a ſimple ſubſtance, we confeſs we do ſo with much heſitation. Dr Prieſtley found that melting ſnow and ice always emitted a portion of azote, and its eſcape is the cauſe of the frothy appearance which theſe bodies generally exhibit while melting. Having freed water as completely as poſſible from air, he expoſed it to freeze, and found it emitted azotic gas while melting. He froze the ſame water nine times without contact of air, and each time obtained from it, while melting, nearly the ſame proportion of azotic gas.

Of ATMOSPHERIC AIR.

(572.) We ſhall have occaſion to conſider the phenomena of the atmoſphere at greater length in a future diviſion of the ſubject. At preſent we only conſider it as a compound of the AZOTIC with the oxygen gas. Theſe two ingredients are found to bear nearly the ſame proportion to each other, in all countries where obſervations have been made, and at all elevations of the atmoſphere, in Summer and in Winter. According to Lavoiſier the proportions of the two gaſes which enter into the compoſition of atmoſpheric air, are 73 parts of azotic gas, and 27 of oxygen gas. But later experiments make the proportions to be 78 of azotic gas, and 22 of oxygen gas, by bulk; or by weight, 94 of azotic and 26 of oxygen gas. It is evident that by far the greateſt proportion of the atmoſphere is azotic gas, which is unfit for combuſtion and reſpiration; and we ſhall afterwards ſee good reaſons for this being the caſe.

(573.) A controverſy has ſubſiſted among chemiſts, whether the azotic and oxygen gaſes in atmoſpheric air, be chemically combined, or if they be merely mixed mechanically like particles of duſt among water. Thoſe who inſiſt upon a chemical combination allege, that if this did not take place, the oxygen gas being ſomewhat heavier than the azote, ſhould ſink downwards, and the moſt reſpirable air ſhould be found in the loweſt parts of the atmoſphere; which is not found to be true in fact, as the proportions of theſe gaſes are the ſame at all elevations. They inſiſt that a heavier body could not continue to be diſtributed through a lighter body, unleſs there ſubſiſted between them a chemical union.

(574.) The advocates for mechanical mixture allege that if a chemical union ſubſiſted between the azote and oxigen of the atmoſphere, they ſhould form gaſeous oxide, or nitrous gas, or nitric acid: which is not the caſe. They account for the equal diſtribution of oxygen through the atmoſphere by the conſtant agitation to which it is expoſed; and acknowledge that if it were not for the winds and ſtorms, the oxygen gas would ſeparate from the azote, and the lower parts of the atmoſphere become more reſpirable than the more elevated parts.

(575.) It has been found that when gaſes of different ſpecific gravities, hydrogen and carbonic acid gas for example, are put into the ſame veſſel, the lighter being put uppermoſt, and ſo managed that they are not mixed, in progreſs of time the lighter gas deſcends, and the heavier gas aſcends, and they mix ſo as to form an homogeneous incorporation, without any ſenſible diminution or increaſe of bulk. This happens with gaſes which are not known to combine, or to form any chemical union with each other. This combination ſeems analogous to ſimple ſolution, or the union of ſugar with water, where the bodies are united by corpuſcular attraction while they ſtill retain their individual properties. But it was formerly explained that chemical union, of two or more ingredients, produces a third body, in which the individual properties of the component parts are loſt, and the compound has no property in common with any of its ingredients. Thus the properties of water are very different from thoſe of oxygen or of hydrogen, which enter into its compoſition; and atmoſpheric air is very different from nitric acid, or from nitrous gas or gaſeous oxide, though they all conſiſt of different proportions of the ſame ingredients. In the latter compounds the oxygen forms a ſtrict chemical union with the azote, producing compounds with peculiar properties. In atmoſpheric air, the oxygen ſeems only united with the azote by ſimple ſolution, in which compound each of the ingredients retains its individual properties. Accordingly the oxygen freely exerts its efficacy in ſupporting the reſpiration of animals, and the combuſtion of inflammable bodies.

(576.) But it may ſtill be aſked why theſe gaſes, as they have a chemical affinity for each other, do not form a chemical union?—or why oxygen does not unite with carbon and other inflammable bodies, with which it comes in contact, unleſs the body be heated to the temperature of ignition?

(577.) The common anſwer to theſe queſtions is, that theſe gaſes are compounded with latent caloric, and unleſs this can be thrown out of union with them, they retain their elaſtic form, and will not unite with inflammable bodies, or with each other.—But as we formerly obſerved, oxygen unites with azote without parting with any great quantity of caloric, for the nitric acid, and the other compounds thus formed, ſeem as capable of ſupporting combuſtion as the oxygen gas in its uncombined ſtate. Hydrogen, carbon, and other inflammables will not unite with oxygen until they be firſt raiſed to the point of ignition; and if their gaſeous ſtate be owing to combination with caloric, adding more heat ſeems a ſtrange way of deſtroying this ſtate, as it ſhould expand and render them more elaſtic; and, of courſe, leſs apt to combine.

(578.) From the exploſion of hydrogen and oxygen when condenſed in the barrel of an air-gun, we are inclined to conſider gaſeous bodies to have their particles ſo far ſeparated from each other, that the attraction of coheſion, or of chemical affinity, no longer operates upon them; but that a repulſion takes place, which would ſeparate them to an unlimited diſtance, were it not counteracted by the power of gravity, which draws them towards the earth. When two of theſe gaſes are mixed, which have a chemical affinity for each other, in order that this may operate, it ſeems only neceſſary to bring the particles of the two bodies within the ſphere of chemical attraction; which is done by compreſſion in the caſe alluded to, and may be effected by impulſe, or percuſſion, in other caſes, which only reiterated compreſſion.

(579.) We conceive that the union of oxygen and azote, (deſcribed 558.) is effected in conſequence of the violent concuſſion among the particles of theſe gaſes, produced by the paſſage of electric ſparks, or ſhocks thro' them, which brings the particles within the ſphere of chemical attraction. We had formerly an opportunity of deſcribing the violent agitation excited in fluids by a very ſlight difference in temperature between the external and internal parts of the fluid. Even the eye can diſcern the violent and tremulous agitation which a red hot iron excites in the air. A piece of ignited charcoal excites a ſimilar concuſſion, with this difference, that the carbon having a ſtrong chemical affinity for oxygen gas, the percuſſion brings this ſubſtance within the ſphere of its attraction, ſo that they unite and a continued combuſtion is the conſequence.

(580.) The muriatic and fluoric gaſes, which are deemed to be ſimple bodies, as they poſſeſs acid qualities, are reſerved until we come to treat of Acids.—The other compound gaſes ſhall be deſcribed under their baſes, or the bodies of which they are compounded.

DIVISION II.

Inflammable Solids.

(581.) These may all be reduced to the following which are eſteemed ſimple bodies; and the other inflammable ſolids are only compounded of theſe in various proportions.

I. Carbon or Diamond.
II. Phosphorus.
III. Sulphur.

Sect. I. Carbon *or* Diamond.

(582.) If a piece of wood be put into a covered crucible, or any other veſſel which prevents the atmoſpheric air from acting upon it, and kept red hot for ſome time, it is converted into a black ſhining ſubſtance, without taſte or ſmell, known under the name of *charcoal*. When made in the large way, the wood is generally built on end into to a large conical pile, or ſtack, commonly on a circular trough of maſonary. It is then covered with a cloſe building of turf, and a fire of bruſhwood kindled below. The perfection of the art conſiſts in charring the wood ſufficiently, with as little diminution of its bulk as poſſible, or the leſt poſſible conſumption of it by the admiſſion of atmoſpheric air. If the wood be pitch-pine, the ſmoke deſcends along covered gutters into reſervoirs, where it is condenſed into tar; and forms an example of what the older chemiſts called *diſtillation per deſcenſum*.

(583.) Charcoal is only the woody fibres of plants from which water, oil, and other volatile ingredients have been evaporated. It contains a portion of oxygen combined with it, either abſorbed during the growth of the plant, or more probably during the proceſs of charring. The charcoal of pitcoal, commonly called *coak*, or *cinder*, does not differ from that of wood, except in ſometimes containing a portion of ſulphur, and always a portion of iron and extraneous earths. The ſame obſervation may be applied to what is called *blind*, or *glance*, coal, which is a mineral carbon.—Charcoal is of the ſame quality from whatever wood it be obtained; only the more denſe woods yield charcoal of greater denſity than thoſe which are more porous; or contain a greater portion of carbon in a given bulk. This ſubſtance alſo abounds in animals, and the muſcular fibres ſeem chiefly to be compoſed of it.

(584.) Charcoal is not ſoluble in water; and the moſt violent heat, provided it be excluded from air and moiſture, produces no other effect than to render it ſomewhat harder and more brilliant. It is therefore ranked among the moſt fixed bodies that are known.

(585.) Its inſolubility in water renders it much leſs apt to putrify, or rot, than wood. This property has long been known, and it has been cuſtomary to char the ſurface of ſtakes that are driven into the ground. Some char only their points; but this ſhould, at leaſt, be extended a little way above the ſurface, as the part of a ſtake which is apteſt to rot, is a ring from the ſurface of the earth downwards, where, as it is commonly expreſſed, the ſtake *is between the wet and the dry*. New-made charcoal, when wrapped up in cloths, abſorbs and deſtroys all fetid odours, and checks the progreſs of their putrefaction. When a little of it is boiled with tainted meat, it renders it ſweet and ſalutary. It has not yet been tried whether this ſubſtance would preſerve fleſh or fiſh in place of ſalt; but it is probable that a little of it, mixed with the ſalt, might be attended with good effects. Charcoal is the beſt teeth powder that has yet been diſcovered, as it abſorbs the putrid matter which gathers about the teeth, and renders the breath ſweet and agreeable. For theſe purpoſes it may be made from a piece of bread, or ſugar, kept ſometime red hot in a ſmall covered cup, or crucible.—Mr Lowitz of Peterſburgh has ſhewn that charcoal may be uſed with advantage for purifying a great variety of ſubſtances.

(586.) Charcoal is a powerful conductor of electricity; tho' moſt ſpecies of well dried wood are non-conductors. When new made, or after being heated in cloſe veſſels, it copiouſly abſorbs water, and air. When in this ſtate, if it be placed in a jar among common air, over mercury, it abſorbs the air, and the mercury aſcends; but if a little water be introduced into the jar, it abſorbs the water, gives out the air, and the mercury deſcends. In this ſtate it was found to abſorb four times its bulk of air; and when plunged into water, it gave out a fifth part of this air. The air given out was deprived of a part of its oxygen.

(587.) Charcoal abſorbs atmoſpheric air without decompoſing it, whether it be cold or hot, though moſt rapidly when it is hot. When heated, it abſorbs oxygen gas more copiouſly than atmoſpheric air. La Metherie having extinguiſhed a piece of burning charcoal by plunging it into mercury, immediately removed it into a veſſel filled with oxygen gas. It abſorbed eight times its bulk of this gas, and afterwards gave out a fourth part of its bulk of this gas when plunged into water. Hence it may be ſeen that charcoal has a ſtronger affinity for oxygen gas, than for azote, the other gas of the atmoſphere.

(588.) Morozzo having expoſed 36 grains of charcoal, to 4·5 grains of common air, found it abſorbed ·41 per cent of the air. When hydrogen gas was put in place of the air, it abſorbed 17 per cent of this gas. When oxygen gas was applied, it abſorbed the whole, or 4·5 grains, after the oxygen had been allowed to remain in contact with the charcoal during ſeveral days. The charcoal acquired the weight the gaſes had loſt, and when plunged into water gave out only a ſmall quantity of air.

(589.) Morozzo obſerved that the charcoal of beech and boxwood abſorbed moſt air; that of willow and poplar ſomewhat leſs; that of hazel and vine-twigs ſtill leſs; and that the charcoal of cork, which is very light, abſorbed leaſt of any.

Sect. II. Gaseous compounds *of* Carbon.

Theſe are,

I. Carbonic acid gas.

(590.) If a piece of charcoal be heated until it approaches the point of ignition, or to about 802°, and then be plunged into a jar filled with oxygen gas, it ſuddenly takes fire. If the charcoal be freed of earth and ſalts with which it is often contaminated; or if it be *lamp black*, which is charcoal nearly pure, it burns without leaving any reſiduum. Or the ſame effect may be obtained by placing the charcoal on a pedeſtal, in the centre of a jar filled with oxygen gas over mercury, and kindling it by means of a burning-glaſs.

(591.) After the burning has ceaſed, the charcoal will have diſappeared, though neither the bulk nor appearance of the gas are ſenſibly altered. But the gas will be found to have undergone a complete change in its qualities or properties. According to the quantity of carbon conſumed, the whole, or greateſt part of the gas will be found changed into a new gas, very different from oxygen, which has obtained the name of *carbonic acid*. By letting up lime-water into the jar, the lime will abſorb the new gas, and the water will become milky; and hence lime-water is uſed as a certain teſt of the preſence of carbonic acid, when mixed in other gaſes.

(592.) By a very laborious train of experiments, Lavoiſier aſcertained that the combuſtion of charcoal is nothing but its combination with oxygen, ſo as to form carbonic acid; and that into the compoſition of carbonic acid there entered 28 parts of charcoal with 72 of oxygen. The ſame experiments have been repeated by different philoſophers with nearly the ſame reſult; and Dr Thomſon preſents the medium of their experiments, as the conſtituents of carbonic acid, as follows

26 charcoal
74 oxygen
——
100

This gas extinguiſhes combuſtion, and deſtroys animal life when reſpired. It is conſiderably heavier than common air, ſo that when a decanter is filled with it, and poured out, it deſcends and extinguiſhes a lighted candle, placed upon the floor, from a conſiderable height. But as it is an acid, its properties will be more fully conſidered under that claſs of bodies.

(593.) If the combuſtion of charcoal in oxygen gas be continued a conſiderable time, water depoſits, and trickles down the ſide of the veſſel. This led Lavoiſier to ſuſpect that charcoal is not pure carbon, but that it contains a portion of hydrogen, which uniting with a portion of the oxygen, forms the water in queſtion. He eſtimated the proportion of hydrogen in common charcoal to be ⅕th of the whole. The ſubſequent experiments of Prieſtley and Cruikſhanks have amply confirmed the deductions of Lavoiſier. We muſt not then conſider charcoal to be pure carbon; though, as the greateſt part of it is carbon, we can deduce the properties of carbon from its combinations. We ſhall ſee that the *diamond* is the only example of carbon either abſolutely pure, or nearly ſo.

(594.) Carbon likewiſe combines with a ſmaller proportion of oxygen, than in the former caſe, and the compound is an inflammable gas, heavier than hydrogen, which, as it poſſeſſes no acid properties, has obtained the name of

CARBONIC OXIDE GAS.

(595.) It was firſt made by Dr Prieſtley from a mixture of dried iron filings and chalk, which is a compound of carbonic acid and lime. Theſe being mixed in equal parts, and ſtrongly heated in an iron retort, the iron abſorbs a part of the oxygen, which is a conſtituent of the carbonic acid in the chalk. There comes over a gas, which is a mixture of carbonic acid and of carbonic oxide gaſes. Lime-water being introduced into the recipient, the carbonic acid gas is abſorbed, and the carbonic oxide gas remains behind.

(596.) When carbonic acid gas is conveyed through a red hot tube, containing charcoal, the nature of the gas is changed. Part of the charcoal combines with the carbonic acid, and converts it into carbonic oxide. Or when charcoal is long expoſed to the heat of a burning glaſs, in a veſſel filled with carbonic acid, part of the charcoal combines with the acid, and converts it into carbonic oxide.

(597.) This gas, like the others deſcribed, is a tranſparent, elaſtic, and compreſſible fluid. It is inflammable; burns with a deep blue flame, and emits little light. It is much heavier than hydrogen; its ſpecific gravity, at medium preſſure and temperature being 0·956, that of air being 1·000. Hence 100 cubic inches of it weigh 30 grains Troy. When mixed with oxygen it detonates, but not loudly. When 100 inches of it are mixed with 40 inches of oxygen gas, the whole is conſumed, and 92 inches of carbonic acid are formed. It often contains hydrogen in union with it; but the experiments of Mr Henry render it probable that this is merely accidental, and not eſſential to it. It extinguiſhes flame, and animal life when reſpired. From the above data this gas has been calculated to be compoſed of

37·8 carbon
62·2 oxygen
——
100·0

Thus carbon forms gaſeous products when united with oxygen in two proportions.

(598.) But carbon alſo forms gaſeous products when united, in certain proportions, with hydrogen. Theſe products formerly obtained the name of *heavy inflammable airs*; but the moſt common one is now known by the name of

CARBURETED HYDROGEN GAS.

(599.) This gas is obtained from charcoal, eſpecially if it has been ſome time expoſed to dampneſs, when put into an iron retort, and expoſed to a ſtrong heat. The gas deſcribed (544.) is partly of this ſort; for when the ſteam of water is paſſed through a tube filled with ignited charcoal, the water is decompoſed, its oxygen unites with the charcoal, forming carbonic acid gas, and part of the hydrogen unites with another part of the charcoal, forming carbureted hydrogen gas. A ſimilar gas is obtained by paſſing alcohol, ether, or camphor, through red hot tubes; by diſtilling oils, wood, pit-coal, bones, or indeed almoſt any animal or vegetable ſubſtance whatever.

(600.) The heavy inflammable airs were firſt diſcovered by Dr Prieſtley, but were firſt examined by Lavoiſier, Dr Higgins, and Dr Auſtin. They diſtinguiſhed them from hydrogen, not only by their greater ſpecific gravity, but alſo from their yielding a twofold product, carbonic acid and water, when mixed with oxygen and inflamed. Though many experiments have been lately made on theſe gaſes, by Dr Prieſtley, Cruikſhanks, Berthollet, Henry, and others, their compoſition and qualities are ſtill involved in much uncertainty. Some think their number indefinite, while Mr Henry and Mr Dalton hold an opinion which ſeems the moſt probable, that there are only three ſpecies of heavy *inflammable air*, and that all their varieties are only mixtures of theſe three in various proportions. We ſhall therefore detail the properties of theſe three, as far as they have been aſcertained.

(601.) Carbureted hydrogen gas riſes in great quantities, in hot weather, from marſhes and ſtagnant water, where it may be collected by filling a glaſs bell with water, and inverting it with its mouth about an inch below the ſurface of the marſh, or putrid pool. The gas which riſes will diſplace the water in the bell, and occupy its place. It alſo abounds, and is conſtantly forming, in all fertile or well manured ſoils; and ſome think that the beſt teſt of the fertility of a ſoil, is the quantity of this gas which a given weight of the ſoil yields by diſtillation.

(602.) This gas is inviſible and elaſtic, like common air. It burns with a whiter and more brilliant flame than hydrogen gas. According to Cruikſhanks, its ſpecific gravity is 0·67774; that of common air being 1·000. At the temperature of 60°, 100 cubic inches of it weigh 21 grains. Mixed with oxygen gas, and fired by the electric ſpark, it explodes, and leaves a reſidue more bulky than the original gas. Much of this reſidue is found to be carbonic acid, becauſe lime-water being introduced, abſorbs the greateſt part of it. Part of the reſidue is water, which firſt forms a dewy cloud, and then collects in drops on the ſides of the veſſel. Mr Dalton found that the gas from ſtagnant water alſo left a reſidue of $\frac{1}{5}$th of its bulk, of *azote*. This gas then is a mixture of four parts of carbureted hydrogen, and one of azote. Mr Henry aſcertained that carbureted hydrogen requires twice its bulk of oxygen gas for its combuſtion, and that the quantity of carbonic acid produced, is equal to the original bulk of the carbureted hydrogen. From theſe data, with conſideration of the water produced during the exploſion, he determined the conſtituents of this gas to be

$$\begin{array}{rl} 30\frac{1}{7} & \text{hydrogen} \\ 69\frac{6}{7} & \text{carbon} \\ \hline 100 & \end{array}$$

The gas obtained by diſtilling acetate of potaſh, to be afterwards deſcribed, ſeems nearly the ſame with the one whoſe properties have been ſtated above.

(603.) As ſeveral attempts have been made to convert the carbureted hydrogen gas to economical purpoſes, it may not be improper to give a ſhort account of the origin and progreſs of theſe attempts, that our readers may judge how far they are likely to be attended with advantage.

(604.) The idea of applying this gas to uſeful purpoſes, firſt occurred, in 1792, to Mr Murdoch at Redruth in Cornwall, manager of engines in that county for Boulton and Watt of Birmingham. He had made many experiments upon the gaſes obtained by diſtilling, coal, peat, wood, and a variety of ſubſtances; and obſerving they burnt with a bright flame, thought they might be ſubſtituted in place of lamps and candles for lighting rooms. In 1797, his experiments were repeated at Old Cumnock in Airſhire. In 1798, he conſtructed an apparatus for lighting the Soho manufactory by means of theſe gaſes; and at the peace of 1802, a grand illumination of the buildings, by means of theſe gaſes, was exhibited to public view. His ideas were ſoon adopted in France, by a perſon who lighted his houſe and gardens on his plan; and it was propoſed to light the whole city of Paris by ſubſtituting theſe gaſes in place of lamps. It was ſoon adopted at Edinburgh, and many other places, for lighting ſhops.

(605.) Many ſucceſſive exhibitions were made of this mode of illumination, at the Lyceum of London, in 1804. Mr Murdoch found that coal, peat, &c. yielded a very great quantity of this inflammable gas. The coal was put into a retort, (or cylinder of caſt iron for large experiments,) which was built in a ſmall furnace, and ſurrounded with burning coals. The aperture by which the coal was thrown into the cylinder, being cloſely ſtopped, and luted, and the fire kindled in the furnace, the gas was evaporated through a caſt iron tube projecting from the cylinder like the neck of a ſtill. From this tube it was conveyed by tubes of tin or copper into large caſks, well painted to make them tight, where it paſſed through water, and depoſited its ſmoke, or coal tar. From theſe caſks a tube of tin or copper conveyed it to all parts of the building, where it was projected through numerous ſmall apertures, ſometimes arranged like the top of a watering pan, or repreſenting the ſun and ſtars. Upon applying lighted tapers, the gas projected through theſe apertures, burnt with a bright and ſteady flame. By ſhutting a ſtop-cock in the main tube, the current of the gas was intercepted, and the whole extinguiſhed in an inſtant.

(606.) At the Lyceum a tube of about an inch bore, was made to riſe through a table, through which the gas might be admitted to riſe at pleaſure, and made to burn like a cylindrical lamp, or any other form, by varying its aperture. By its flame a kettle might be boiled, and meat dreſſed in various ways. A large glaſs bell being ſupported over it, ſoon got red hot, and radiated a ſufficient degree of heat to warm a room. For transferable lights, Mr Murdoch filled bladders, and bags of leather, with this gas, which being ſlowly ſqueezed through ſmall apertures, and ſet on fire, might be carried to any part of a houſe.

(607.) We remarked, however, at the Lyceum, that it ſeemed difficult, if not impracticable, to prevent ſome of the gas from eſcaping through cracks or apertures of the apparatus, without being inflamed. The gas which thus eſcaped conveyed a ſuffocating ſenſation to delicate lungs: and hence we concluded that this gas was better adapted for lighting a ſtreet, than the inſide of a houſe.

(608.) Mr Henry aſcertained that the gas derived from the diſtillation of coal is compoſed of the ſame ingredients with that which is extricated from marſhes, and ſtagnant water; except that it contains a ſmall portion of two other inflammable gaſes, which he ſuppoſes to be mechanically mixed, but not chemically combined.

(609.) Dr Auſtin found that when electric ſparks, or ſhocks, were repeatedly paſſed through carbureted hydrogen gas, it expanded to more than double its former bulk, and that the expanded gas required a greater quantity of oxygen to effect its combuſtion, than the ſame gas in its original ſtate. From this circumſtance, and the azote left after combuſtion, he concluded he had ſucceeded in decompoſing carbon; and that it was not a ſimple body, but a compound of hydrogen and azote.

(610.) But Mr Henry, with his uſual preciſion, proved that the expanſion of the gas was owing to water contained in it, which was decompoſed by the electric ſhocks, its oxygen uniting with the carbon of the gas, and forming carbonic acid; while its hydrogen aſſumed the elaſtic or gaſeous ſtate. When he took the precaution of drying his carbureted hydrogen gas, by making it paſs over very dry potaſh, hardly any expanſion was produced in it by the electric ſhocks; unleſs a little water was added to it, when it expanded as before.

(611.) Having detailed the properties of carbureted hydrogen gas, it may only be neceſſary to mention that Mr Watt, who firſt pointed out its deleterious effects when reſpired, gave it the name of *hydro-carbonate;* which Mr Henry has lately changed into *hydro-carburet*, a name altogether unexceptionable. This circumſtance is mentioned that if theſe names ſhould occur in books, it may be known what ſubſtance is indicated by them.

SUPER-CARBURETED HYDROGEN, *or* OLEFIANT GAS.

(612.) This gas was firſt diſcovered by the Dutch chemiſts, who, for a reaſon about to be ſtated, called it *Olefiant gas*.

(613.) This gas is obtained by mixing four meaſures of ſulphuric acid, with one of alcohol, in a retort. The mixture becomes very hot, and aſſumes a brown colour. If the beak of the retort be held under water, and the heat of a lamp applied to it, the gas riſes in great abundance, and may be collected in a jar, previouſly filled with water, and inverted in the pneumatic trough, as formerly deſcribed.

(614.) This gas is inviſible and elaſtic, like common air; but poſſeſſes a fetid odour, probably owing to ſome oil diſſolved in it. It extinguiſhes combuſtion, and animal life, when reſpired. In contact with common air, it burns a conſiderable time, with a very white and brilliant flame. Mixed with oxygen gas, and fired in cloſe veſſels by electricity, it explodes, leaving a product of carbonic acid and water. From this we learn its conſtituents to be carbon and hydrogen. The Dutch chemiſts aſcertained its ſpecific gravity to be 0·905, that of air being 1·000.

(615.) Mr Henry aſcertained that 284 inches of oxygen gas, were neceſſary for the complete combuſtion of 100 inches of olefiant gas. From this circumſtance, compared with the products of combuſtion, he determined the conſtituents of this gas to be

$79\frac{2}{3}$ carbon
$20\frac{1}{3}$ hydrogen.

100

Hence this gas is compoſed of the ſame ingredients with the former, only it contains nearly a double portion of carbon; as may be ſeen from the following compariſon.

	Hydrogen.	*Carbon.*
Carbureted hydrogen	100	229·0
Super-carbureted hydrogen	100	392·0

Berthollet makes the conſtituents of this gas to be one part hydrogen, and three parts carbon. But he does not ſtate the data on which his concluſion is founded.

(616.) Berthollet obſerved that when four meaſures of this gas, were mixed with three of oxygen gas, and fired by electricity, the mixture dilates ſo as to occupy the bulk of 11 meaſures, and a quantity of charry matter is depoſited. By adding more oxygen, the dilated gas is ſtill capable of detonation. The cauſe of this is not clearly aſcertained. Perhaps an under proportion of oxygen may combine wholly with the carbon, forming carbonic acid gas, and ſetting looſe the hydrogen gas, or the effect may be owing to the decompoſition of water.

(617.) The moſt remarkable property of this gas, and which induced the Dutch chemiſts to give it the name of *olefiant*, is, that if three meaſures of olefiant gas be mixed with four meaſures of oxymuriatic gas (which will be afterwards deſcribed) both gaſes ſuddenly diſappear, and there is formed an opal coloured oil. But Mr Henry found that five meaſures of olefiant gas, and ſix meaſures of oxymuriatic gas, was a better proportion; and the rapid formation of oil, has enabled him to detect the olefiant gas in various inflammable gaſes, and thus to analyſe them: juſt as the application of lime-water detects the carbonic acid gas, and abſorbs it from any gaſes in which it may be mixed.

(618.) The other *hydro-carburets* are not ſenſibly abſorbed by water; but 100 inches of water abſorb about 11 inches, or nearly $\frac{1}{9}$th of its bulk of olefiant gas.

HYDRO-CARBONIC OXIDE GAS.

(619.) When the ſteam of water is paſſed through a porcelain tube, containing ignited charcoal, as formerly deſcribed, if the water be paſſed ſo rapidly that part of it comes over unchanged, a conſiderable proportion of the gas that is formed is carbonic acid, and the remainder is inflammable. But if the ſteam be paſſed very ſlowly, the whole, or greateſt part of the gas that is formed, is inflammable, and is either heavy inflammable air, or a gas formed by the combination of hydrogen with oxide of carbon. In fact the compoſition and qualities of the gaſes formed in this caſe, is perpetually varying, from the degree of heat to which the charcoal in the tube is raiſed, and the rapidity or ſlowneſs with which the ſteam is made to paſs over it. Mr Henry thinks this gas to be a mixture, but not a chemical combination, of hydrogen with carbonic oxide gas. But as the properties of this gas have not been minutely examined, it is unneceſſary to add more concerning it.

(620.) Thus it may appear that carbon unites with hydrogen, and forms gaſeous compounds, in two proportions. That it alſo apparently unites with oxygen and hydrogen, forming a gas compoſed of the three ingredients, oxygen, hydrogen, and carbon.

(621.) Mr Henry aſcertained that the gas obtained by diſtilling coal, was chiefly carbureted hydrogen, with a ſmall mixture of carbonic oxide, and of olefiant gas. That the gaſes obtained by diſtilling oil and wax are carbureted hydrogen, with from $\frac{1}{8}$th to $\frac{1}{3}$th of their bulk of olefiant gas. Olefiant gas is alſo preſent in the gaſes obtained by paſſing ſome of the oils, ether, camphor, or alcohol through red hot tubes.

SECT. III. THE DIAMOND.

(622.) The diamond is a precious ſtone which is commonly found at Golconda or the Brazils. The vanity of mankind has ſet an extravagant value upon this ſtone, as an ornament, though it is hardly applicable to any uſe. When pure it is perfectly tranſparent like cryſtal, though much more brilliant. Its form is various, though it is often cryſtallized into a ſix-ſided priſm, terminated by a ſix-ſided pyramid. Though ſomewhat brittle, it is the hardeſt of all known bodies, and tempered ſteel makes no impreſſion upon it. This ſtone can only be poliſhed by diamond powder, which is obtained by rubbing one diamond againſt another. It is a non-conductor of electricity, and, in this reſpect differs from charcoal. Its ſpecific gravity is about 3·5.

(623.) We formerly mentioned, that, from its refracting the rays of light more powerfully than any other body, Sir Iſaac Newton pronounced the diamond to be an inflammable ſubſtance. This opinion was firſt verified by the Florentine academicians, in preſence of Coſino III. Grand Duke of Tuſcany, in 1694. It was afterwards more fully verified by Francis I. Emperor of Germany, and by many French chemiſts, who conſumed ſeveral diamonds in furnaces. Lavoiſier proved that the diamond, in theſe caſes, was not merely evaporated, but actually burnt; and that when air was excluded, it underwent no change.

(624.) Lavoiſier having burnt diamonds in cloſe veſſels, by means of burning glaſſes, aſcertained that oxygen combined with them during combuſtion, producing carbonic acid gas, and preciſely the ſame reſults as would have been obtained from the combuſtion of charcoal.

(625.) Sir George Mackenzie of Coul, baronet, aſcertained that an exceſſive heat is not neceſſary for the combuſtion of diamonds. They burnt under a muffle at 14° of Wedgewood's pyrometer; a heat conſiderably below the melting point of ſilver. At this temperature they increaſe ſomewhat in bulk; burn rapidly with a low flame; and their ſurface, eſpecially when burnt in cloſe veſſels by means of burning glaſſes, ſoon becomes coated with charcoal.

(626.) Morveau, in 1785, and Mr Smithſon Tennant in 1797, aſcertained that diamond, like charcoal, burns when dropped into melted nitre, from the oxygen which the nitre, in this caſe, gives out to inflammable bodies. The latter gentleman having put 120 grains of nitre, and 2·5 grains of diamond into a tube of gold, and heated them until the nitre melted, the diamond was wholly conſumed, and converted by union with oxygen, into carbonic acid gas. In one experiment the bulk of this gas was equal to 10·3 ounces of water, and in another to 10·1. The mean is equal to 19·36 inches, or nearly to 9 grains of carbonic acid. But Lavoiſier ſhews that 9 grains of carbonic acid contain about 2·5 of carbon, which was the original weight of the diamond. From this experiment then we are warranted to conclude, that diamond is nothing elſe but carbon in the pureſt form in which that ſubſtance is preſented by nature.

(627.) Morveau, in 1800, repeated Lavoiſier's experiments, and by means of the large burning glaſs of Tſchirnhauſen, conſumed diamonds in glaſs globes filled with oxygen gas. He aſcertained that diamond required a larger proportion of oxygen gas to convert it into carbonic acid, than charcoal. He found that 1 part of diamond during combuſtion combines with 4·55 parts of oxygen, and the carbonic acid formed amounts to 5·55 parts. Or 1 part diamond and 4·55 parts oxygen, make 5·55 parts of carbonic acid. In the following ſtatement the component parts of this gas when formed from charcoal, may be compared with thoſe of the ſame gas when formed from diamond.

26 charcoal	17·88 diamond
74 oxygen	82·12 oxygen
100	100·00

(628.) Though theſe concluſions differ from thoſe of Mr Tennant, and therefore it may be proper to repeat the experiments of Morveau, yet they warrant a belief that common charcoal differs from diamond, not only in containing a portion of hydrogen, which is probably accidental, and not eſſential; but alſo in being already combined with a portion of oxygen, which renders it convertible into carbonic acid gas by a ſmaller addition of oxygen gas, than is neceſſary for the converſion of the diamond. From theſe data, ſuppoſing them verified, which is doubtful, Dr Thomſon calculates that it would require 31·2 parts of oxygen to be added to 68·8 parts of diamond, in order to convert it into 100 parts of charcoal. Or that 100 parts of charcoal conſiſt of

68·8 carbon, or diamond
31·2 oxygen

100·0

II. PHOSPHORUS.

(629.) The ſecond inflammable ſolid formerly mentioned is phoſphorus.

(630.) This ſubſtance is prepared from bones that have been burnt, or calcined, until they emit neither ſmoke nor ſmell, and are afterwards reduced to a fine powder. A hundred parts of this powder are put into a baſon of porcelain or ſtone-ware, and diluted with four times their weight of water. To this 40 parts of ſulphuric acid are added gradually, from time to time, and the mixture is well ſtirred, with a ſtick or porcelain rod, during each addition. The mixture becomes very hot, and numerous air-bubbles eſcape. After all the acid is added, it ſhould be allowed to remain 24 hours, and be well ſtirred as often as it may be convenient.

(631.) The ſulphuric acid combines with the lime in the compoſition of the bones, forming ſulphate of lime, while the phoſphoric acid is diſſolved in the water. The whole is now to be thrown into a filter of cloth, and waſhed into a ſtone-ware baſon, by ſucceſſive additions of water, until the liquor paſſes through without any acid taſte. The white powder left upon the filter is the ſulphate of lime, which may be thrown away.

(632.) To the filtered liquor collected in the baſon, nitrate of lead, or acetate of lead, (commonly called ſugar of lead) muſt be added, in ſolution in water. The nitrate of lead is generally preferred to the acetate, and it ſhould be added ſlowly from time to time, until it no longer precipitates a white powder. This white powder is the acid of phoſphorus in union with the lead, with which it forms an inſoluble compound. This white powder ſhould now be thrown upon another filter, and waſhed by repeated additions of water, until all the nitric acid is ſeparated from it. It ſhould then be allowed to dry, and be well mixed with about one ſixth of its weight of charcoal powder. The mixture is then put into a glazed earthen, or iron retort, and placed in a naked furnace, with the beak of the retort immerſed a little way under water, ſo that its whole aperture be juſt covered. Fire is ſlowly applied, and gradually raiſed, until the retort be heated to whiteneſs. Air-bubbles firſt begin to come over, ſome of which, when they eſcape from the ſurface of the water, take fire. At laſt there drops a ſubſtance which has the appearance of melted wax, and which congeals under the water. This ſubſtance is *phoſphorus*; the acid having been decompoſed in the retort by the ſuperior affinity of ignited charcoal for oxygen.

(633.) Phoſphorus, when pure, is of a yellowiſh colour, and ſemi-tranſparent. When kept ſome time under water it becomes opaque externally, and very much reſembles white wax. It cuts with a knife; is inſoluble in water; its ſpecific gravity is 1·770.

(634.) At its firſt diſtillation, phoſphorus contains ſome powdered charcoal, and other impurities. It is ſeparated from theſe impurities by melting it under warm water, and ſqueezing it through a bag of ſhamoy leather. It is formed into ſticks by pouring it while melted under warm water, into a conical tube or funnel of glaſs, which has its lower or narrower orifice cloſed by a cork. When the tube is full, it is removed into cold water, where the phoſphorus congeals; and the cork being removed, it is puſhed out with a ſtick. Phoſphorus ſhould always be kept in cloſe bottles under water that had been boiled to expel the air from it. When expoſed to the air it is very apt to melt and take fire. It ſhould alſo be excluded from light, which changes it into a brown colour.

(635.) The alchemiſts held human urine to be a microcoſm, or a concentrated extract of all the powerful eſſences of nature preſented under a ſmall bulk. Numerous inveſtigations were made of this ſubſtance, and of human ordure, in hope of finding in them their grand *deſideratum*, or the ſubſtance which was to change all bodies into gold. When employed in extracting from urine a ſubſtance which was to change ſilver into gold, one Brandt, a chemiſt of Hamburgh, in 1669, accidentally ſtumbled on the diſcovery of phoſphorus. He ſhewed a ſpecimen of it to Kunkel, an eminent German chemiſt, who employed Kraſt of Dreſden to purchaſe the ſecret from Brandt, which he effected for 200 dollars. He exacted alſo a promiſe that he was not to reveal it to any other perſon. Kraſt being now in poſſeſſion of the ſecret, paid no regard to his engagements with Kunkel, but went and exhibited his phoſphorus in Britain and France, in hope of making his fortune. Kunkel who only knew that phoſphorus was made from urine, now ſet about the diſcovery himſelf, and ſucceeded about the year 1674. Hence this ſubſtance was long known under the name of Kunkel's phoſphorus.

(636.) Soon after this Mr Boyle ſucceeded in making phoſphorus, and communicated his proceſs to Godfrey Hankwitz, an apothecary of London, who long ſupplied all Europe with phoſphorus, which was hence called *Engliſh phoſphorus*. In 1737, a ſtranger exhibited to ſome members of the Academy at Paris, a proceſs for making phoſphorus. It conſiſted in evaporating to dryneſs a vaſt quantity of urine, and heating the dried reſidue intenſely in ſtone-ware retorts. But this proceſs was tedious and diſguſting, and yielded very little produce.

(637.) In 1769, Gahn, a Swediſh chemiſt, diſcovered that phoſphorus is contained in bones; and very ſoon after Scheele invented a proceſs for extracting it from them. The proceſs above deſcribed, is that of Fourcroy and Vauquelin.

(638.) Many experiments were made, with a view to aſcertain the properties of phoſphorus, by Slare, Boyle, and Hoffman. Margraf firſt examined its effects upon other bodies. He was ſucceeded in this path of inveſtigation by Pelletier, and the ſtill more important diſcoveries of Lavoiſier.

(639.) Phoſphorus melts at the temperature of 99°, and at the ſame time, if in contact with the air, or oxygen gas, it takes fire. When air is excluded, it evaporates at 219°, and boils at 554°. When phoſphorus is expoſed to the air, below its melting temperature, it always emits a white ſmoke, which has the ſmell of garlic, and is luminous in the dark. The ſmoke increaſes as the temperature is raiſed, and is owing to the ſlow combuſtion of the phoſphorus, which in time entirely diſappears.

(640.) Phoſphorus evaporates, or diſſolves in oxygen gas at the temperature of 60°, but the vapour does not become luminous unleſs the temperature be raiſed to 80°. Hence it burns at a lower temperature in common air, than in oxygen gas. When heated to 148, it takes fire, and burns with a very luminous flame, emitting a great quantity of white ſmoke, which ſhines in the dark, and has the ſmell of garlic. No reſidue is left, and the ſmoke when collected is found to be an acid. It alſo takes fire, in the open air, when rubbed, or compreſſed, at low temperatures.

(641.) The high inflammability of phoſphorus rendered it long an object of requeſt among rival ſtateſmen for burning an enemy's dock yards, and other miſchievous purpoſes. But the great difficulty of procuring it in quantities, occaſioned very little miſchief to be done by it. Now that it can be made in large quantities, and at ſmall expence, it has been propoſed to encloſe it in balls of ſoft lead, the aperture to be ſtopped by a plug of lead, well rammed. The weight of the lead would make ſuch a ſhot range nearly as far as a ſolid ball of iron; and if it ſtruck the ſide of a ſhip, it would break like an egg, and ſet her on fire. Such a ſhot would be much more formidable than red hot balls, which cannot be ſafely prepared at ſea.

Acid of Phosphorus.

(642.) Stahl affirmed that phoſphorus was the *muriatic acid* combined with phlogiſton; and that to make phoſphorus it was only neceſſary to effect the combination of muriatic acid and phlogiſton. But Margraf, who laboured long and aſſiduouſly, was not able to effect this combination by any means he could contrive. He obſerved, however, that the combuſtion of phoſphorus produced an acid, whoſe properties differed from thoſe of the muriatic acid; and he concluded that phoſphorus was this peculiar acid united with phlogiſton.

(643.) Boyle had ſhewn that phoſphorus, like other inflammable bodies, would not burn except when in contact with air; and the nature of this ſubſtance, and of the acid formed by its combuſtion, were clearly aſcertained by Lavoiſier.

(644.) He introduced 100 grains of phoſphorus into the glaſs globe formerly deſcribed, which being exhauſted of air by means of an air-pump, and accurately weighed, was filled with oxygen gas. The phoſphorus being fired by means of a burning glaſs, burnt with a bright flame, and much heat. White flakes filled the glaſs, and coating its ſurface, rendered it opaque. Freſh oxygen was occaſionally ſupplied, and the combuſtion continued until it was extinguiſhed by the white flakes. On weighing the phoſphorus that remained, and collecting and weighing the flakes, it was found that the weight of the latter was preciſely equal to that of the phoſphorus and of the oxygen gas that had diſappeared. The flakes were found to be pure phoſphoric acid; and it followed as an evident conſequence that phoſphoric acid is compoſed of phoſphorus and oxygen united together in certain proportions; and that this acid is the product formed by the combuſtion of phoſphorus.

(645.) From Lavoiſier's experiments it follows that phoſphoric acid is compoſed of 100 parts of phoſphorus, united with 154 parts in weight of oxygen; or that one grain of phoſphorus condenſes and combines with 4½ cubic inches of oxygen gas, and 5 grains are capable of depriving 102¼ cubic inches of air of all its oxygen gas.

Oxide *of* Phosphorus.

(646.) This ſubſtance is capable of combining with a lower proportion of oxygen than is neceſſary to convert it into an acid, which is therefore called an oxide. This combination takes fire at a much lower temperature than pure phoſphorus; juſt as charcoal takes fire at a lower temperature than diamond, or pure carbon. Phoſphorus may be oxidiſed by heating it, ſome time, in a long narrow glaſs tube, whoſe extremity is immerſed in boiling water. This cauſes it to riſe in luminous white vapour, which lines the tube, and it will then take fire by the heat of the hand. This oxide is ſometimes kept in a ſmall tin box, which being opened, it kindles, and lights candles in the dark. Or a ſmall wax taper is hermetically ſealed in a ſmall gaſs tube, having a particle of this oxide upon its point. Upon breaking the tube, and pulling out the taper, it ſuddenly takes fire, provided it had been previouſly heated by being in contact with the body. For theſe purpoſes the oxide of phoſphorus is commonly mixed with oil, or ſulphur.—The white cruſt formed by keeping phoſphorus long under water, is thought to be an oxide. But it is brittle, leſs fuſible and inflammable than pure phoſphorus, and may be ſeparated plunging the maſs into water at the temperature of about 100°. The pure phoſphorus will diſſolve, while the cruſt remains unchanged, and floats upon its ſurface.

Phosphurets.

(647.) The compounds of phoſphorus with ſolid bodies are called *phoſphurets*. Theſe ſhall be noticed in their order; but at preſent we confine ourſelves to the combination of phoſphorus with carbon, called *phoſphuret of carbon*.

(648.) This is the browniſh red ſubſtance which is obtained by ſqueezing phoſphorus through ſhamoy leather, as directed in the purification of phoſphorus. It conſiſts of phoſphorus united with charcoal in exceſs; and being expoſed to a moderate heat in a retort, the ſuperfluous phoſphorus is expelled, and there remains a light flocky powder, of a lively orange red, without taſte or ſmell. This powder is pure phoſphuret of carbon. It burns rapidly when heated in the open air, and a quantity of charcoal is left behind. When heated red hot in a retort, the phoſphorus is expelled, and the charcoal remains.

GASEOUS COMPOUNDS of PHOSPHORUS.

Phosphorized Hydrogen gas.

(649.) When phoſphorus is kept ſome time in hydrogen gas, part of it is diſſolved, and conveys to the gas a ſlight ſmell of garlic. Fourcroy and Vauquelin, the diſcoverers, gave to this gas the name of *phoſphorized hydrogen gas*. When bubbles of it are thrown up into a jar of oxygen gas, a very brilliant bluiſh flame is produced, which occupies the whole veſſel. The flame is produced by the combuſtion of the phoſphorus, which, however, does not ſeem to affect the hydrogen gas.

Phosphureted Hydrogen Gas.

(650.) When phoſphorus is melted by a burning glaſs in a jar of hydrogen gas, ſtanding over mercury, the hydrogen combines with a much greater proportion of the phoſphorus than in the former caſe. This compound gas was diſcovered by Mr Gengembre in 1783, and by Mr Kirwan in 1784; but Mr Raymond publiſhed an account of its properties in 1791, and another in 1800. It has obtained the name of *phoſphureted hydrogen gas*.

(651.) It has a very fetid ſmell, ſimilar to that of rotten fiſh. In contact with common air, it burns with great rapidity; and is the moſt inflammable of all ſubſtances yet known. In contact with oxygen gas, it burns with ſtill greater rapidity and brilliancy; and when mixed with common air, or oxygen gas, it detonates with great violence. When bubbles of it are made to riſe up through water, they explode in ſucceſſion as they reach the ſurface, and a beautiful coronet of white ſmoke riſes, after each exploſion, to the roof of the room. This ſmoke is compoſed of phoſphoric acid and water, formed by the combuſtion of the gas. Hence it is evident that the combuſtion riſes to the point of ignition, ſo as to inflame the hydrogen gas, as well as the phoſphorus in union with it.

(652.) Pure water, of temperature between 50° and 60°, when agitated in contact with this gas, diſſolves about the fourth part of its bulk of it. This combination is of the colour of roll ſulphur; has a diſagreeable ſmell, and a very bitter taſte. By boiling the gas is expelled, and the water remains pure. By expoſure to the air, the phoſphorus is converted into an oxide, and drops to the bottom; while the hydrogen gas eſcapes, and the water remains pure.

(653.) Phoſphorus, taken internally, is poiſonous. But in dozes of about one fourth of a grain, it is recommended by ſome for reſtoring ſtrength that has been exhauſted by ſenſual indulgence; or rather for ſtimulating the ſexual appetite.

III. SULPHUR.

(654.) The third and laſt of the inflammable ſolids formerly mentioned, is *ſulphur*, which is alſo called *brimſtone*.

(655.) This ſubſtance abounds in the neighbourhood of Hecla, of Veſuvias, and other volcanos; where it has probably been evaporated from *pyrites* by ſubterraneous heat. It alſo abounds in thoſe minerals which have obtained the name of pyrites, which are metals combined with ſulphur; of which the material pyrites are very common and abundant. From pyrites it may be obtained by diſtillation; and in ſome places where ores mineralized by ſulphur are roaſted, the fumes are conducted through a long covered gallery, where the ſulphur condenſes and depoſits.

(656.) Sulphur is a hard brittle ſubſtance, commonly of a yellow colour, without any ſmell, and hardly of any taſte. It has been uſed in medicine from the earlieſt times, and wool has long been whitened by being expoſed to its fumes. It is a non-conductor of electricity; becomes electric by friction; and its ſpecific gravity is 1·990.

(657.) Sulphur is unchanged by expoſure to air; it is inſoluble in water; and when a large piece of it is expoſed to a ſudden but gentle heat, that of the hand for inſtance, it falls in pieces with a crackling noiſe.

(658.) At about 170° of temperature, ſulphur riſes in vapour, which may be condenſed in proper veſſels. This is called the *ſublimation* of ſulphur, and the powder formed by its condenſation is called *flowers of ſulphur*. This volatilized ſulphur is the pureſt that can be got; as what is made up in rolls commonly contains a portion of extraneous bodies. But air muſt be excluded from the veſſels in which the proceſs is performed.

(659.) At 214° ſulphur melts, and becomes as liquid as water. It changes to a brown colour; but becomes yellow and brittle if ſoon cooled. If cooled ſlowly it cryſtallizes into priſmatic needles, which are more diſtinct if part of the ſulphur be poured out after the ſurface is congealed. If ſulphur be kept liquid for ſome time, it becomes thick and viſcid; and if it be poured into cold water it retains its ſoftneſs, and in this ſtate is uſed for taking impreſſions of ſeals and medals, which are called *ſulphurs*.

(660.) When heated to 560° in the open air, ſulphur takes fire ſpontaneouſly, burns with a blue flame, and emits a great quantity of ſuffocating fumes.

(661.) Sulphur combines with oxygen, hydrogen, azote, carbon, and phoſphorus.

OXIDE OF SULPHUR.

(662.) With oxygen ſulphur forms compounds in ſeveral proportions, the loweſt of which poſſeſs no acid properties, and are called *oxides*. The higher proportions of oxygen combined with ſulphur, form acid products.

(663. When ſulphur is kept ſome time in a liquid ſtate, in an open veſſel, as already deſcribed, it imbibes a portion of oxygen, which ſeems to be the cauſe of the red colour it aſſumes. Dr Thomſon examined an oxide formed in this manner, and found its ſpecific gravity to be 2·325, and it contained 2$\frac{4}{10}$ per cent of oxygen. Another oxide formed by paſſing oxymuriatic gas through flowers of ſulphur, contained 6·2 of oxygen.

SULPHUROUS ACID GAS.

(664.) When ſulphur is burnt in the open air, it combines with a higher proportion of oxygen than that which enters into the compoſition of its oxide; and is converted into a gas poſſeſſing acid properties, which will be deſcribed under the diviſion of acids. It is this gas which whitens wool, and woollen cloths, when expoſed to the vapours of burning ſulphur. It has a diſagreeable ſuffocating ſmell, and may be collected in the ſame way as the other gaſes.

SULPHURIC ACID.

(665.) The third and higheſt combination of ſulphur with oxygen conſtitutes ſulphuric acid, which will alſo be deſcribed under the acids.

(666.) This compound is formed by burning ſulphur in oxygen gas, or by boiling ſulphur with *nitric* acid. In this way Thenard aſcertained that 100 parts of ſulphur unite with 80 of oxygen gas, though Mr Chenevix makes it only 62·6. The medium is 71·3 of oxygen to 100 parts of ſulphur. If this medium be correct, 100 grains of ſulphur unite with 209 cubic inches of oxygen gas, in order to conſtitute ſulphuric acid; and one grain of ſulphur is capable of depriving 9½ inches of common air of all its oxygen.

SULPHURETED HYDROGEN GAS.

(667.) We mentioned that ſulphur unites with hydrogen gas. This compound forms a gas which is inflammable. It was firſt called *ſtinking ſulphureous air*, then *hepatic air*; until Gengembre, who aſcertained its compoſition, affixed its preſent name. It is contained in all thoſe ſprings which are thought to have the ſmell and taſte of rotten eggs.

(668.) This gas may be obtained from three parts of iron filings, and two parts of ſulphur, melted in a cloſe crucible, and the heat continued until the ſulphur ceaſes to ſublime. Being allowed to cool, the mixture muſt be reduced to powder, and put into a glaſs bottle, with a double neck, with a little water. Into one neck of the bottle a bent glaſs tube muſt be fitted; and into the other muriatic acid muſt be poured, and the aperture cloſely ſtopped. The gas will riſe in abundance through the bent tube, and may be collected in a jar filled with water, and inverted in the pneumatic trough formerly deſcribed.

(669.) This gas is colourleſs, elaſtic, and compreſſible, like common air. It has a ſtrong ſmell, like that of rotten eggs. It extinguiſhes combuſtion, and ſuffocates animals when reſpired. It is heavier than common air; its ſpecific gravity being, according to Kirwan 1·106, that of air being 1·000. But Thenard makes it as high as 1·231. —The temperature being 60° and barometer 30 inches, according to Kirwan 100 inches of it weigh 34·285 grains; according to Thevenot 38·17 grains.

(670.) This gas is readily abſorbed by water, of which 100 cubic inches, by Henry's experiments, at the temperature of 55°, abſorb 86 inches of ſulphureted hydrogen. The impregnated water is colourleſs, but has the ſmell and taſte of the gas, changes vegetable blues to a red, and exhibits other properties of acids. By expoſure to air, or boiling the water, the gas eſcapes, and generally leaves part of the ſulphur in the form of a white ſediment. This is the reaſon why ſprings, which contain this gas, depoſit a white ſediment in their courſe from the fountain.

(671.) It burns with a bluiſh red flame, and at the ſame time depoſits a quantity of ſulphur. Mixed with common air, it burns rapidly, but does not explode: but mixed with its own bulk of oxygen gas, it explodes, and the product is ſulphuric acid and water. When agitated by the electric ſpark, it depoſits ſulphur; and alſo when agitated with nitric acid, when that acid is dropped into water impregnated with it. The hydrogen gas in this compound is reduced to nearly ¼th of its original bulk; and 100 parts by weight of hydrogen are united with 295·8 parts of ſulphur. According to the experiments of Thenard, ſulphureted hydrogen gas is compoſed of

28·73	ſulphur
9·71	hydrogen
38·44	

(672.) If bits of phoſphorus be immerſed in this gas, part of it is diſſolved, and the gas exhibits a luminous bluiſh flame when it comes in contact with common air, owing to the combuſtion of the phoſphorus. For the ſame reaſon when the hands, or a ſponge are plunged into it, they continue to be luminous in a dark room for ſome time after.

SULPHURETED AZOTIC GAS.

(673.) When ſulphur is heated in a veſſel containing azote, a portion of it is ſaid to diſſolve, forming a compound gas of a fetid ſmell. This gas is ſaid to have been lately detected in the waters of *Aix-la-Chapelle*: but as little attention has been paid to it, its properties are unknown.

CARBURET OF SULPHUR.

(674.) Sulphur combines with carbon at a high temperature. For the method of making this preparation we are indebted to Clement and Deſormes, who have particularly inveſtigated the properties of this combination.

(675.) Into a porcelain tube a quantity of charcoal is put in bits, or in powder well dried. This tube is paſſed through a furnace, and is inclined a little towards one end, and ſo placed that the central part where the charcoal is ſituated, may be heated red hot. After the heat has expelled all vapour from the charcoal, to the higher end of the tube is luted a glaſs tube containing bits of ſulphur, the extremity of which is cloſely ſtopped by a cork, through which paſſes a wire, by which the bits of ſulphur may be ſlowly puſhed down towards the charcoal in the ignited tube, where they melt and incorporate. The product iſſues by the lower extremity of the porcelain tube, which muſt have a bent glaſs tube luted to it, ſo as to convey the product to the bottom of a bottle nearly filled with water.

(678.) The product is a liquid, and tranſparent when pure; but frequently has a greeniſh yellow tinge. Its taſte is cooling and pungent; its odour ſtrong and peculiar. It does not combine with water. Its ſpecific gravity is 1·3. In the exhauſted receiver of an air-pump, it aſſumes the form of a gas; but returns to the liquid form when the preſſure of the air is reſtored.

(679.) It burns like ſpirit of wine and other liquids; at the ſame time it depoſits ſulphur; and charcoal is left behind. It combines with oxygen gas, and aſſumes the gaſeous form. If a lighted taper be applied to the mouth of a bottle containing this mixture, it explodes with great violence. It gradually combines with common air when placed in contact with it, and aſſumes the gaſeous form. This mixture burns quietly, but does not explode. It readily diſſolves phoſphorus, and a ſmall portion of ſulphur; but does not act upon charcoal.

(680.) Variations in the degree of heat; the quickneſs or ſlowneſs with which the ſulphur is brought in contact with the charcoal in the ignited tube, and various other cauſes, render the reſults of this experiment uncertain.

SULPHURET OF PHOSPHORUS.

(681.) Sulphur, as formerly hinted, combines readily with phoſphorus. To combine them, it is only neceſſary to heat them together in a glaſs tube, or phial, from which the air is excluded, which would ſet them on fire. When they melt they incorporate. This compound is more combuſtible than phoſphorus itſelf. If ſet on fire by a hot wire, and allowed to burn a little, and then extinguiſhed by excluding the air, the mixture is oxidized, and ever after takes fire ſpontaneouſly when it comes in contact with air.

(682.) They may alſo be combined by heating them very ſlowly and cautiouſly, in a flaſk, or glaſs retort, nearly filled with water. If the water be too much heated, part of it is decompoſed, a portion of the combuſtibles is converted into acids by combining with the oxygen of the water; while ſulphureted and phoſphoreted hydrogen gaſes are evolved. Dr Thomſon obſerved that at the boiling temperature, theſe gaſes are evolved with ſuch rapidity as to occaſion violent exploſions. The gaſes emitted during theſe exploſions, burn ſpontaneouſly when they come in contact with air.

(683.) The ſulphuret of phoſphorus, formed under water, has a yellow colour. It conveys to water in which it is kept a ſour taſte, and the ſmell of ſulphureted hydrogen. It takes fire at a lower temperature than the mixture prepared in the dry way. Theſe circumſtances induce a belief that the ingredients in its compoſition had been converted into oxides, by abſorbing a portion of oxygen from the water in which it was made. This compound is not decompoſed by diſtillation.

(684.) The ſulphuret of phoſphorus becomes liquid at a lower temperature than either of the ingredients when ſeparate; and the tendency to liquidity is greateſt when the mixture conſiſts of equal parts of phoſphorus and ſulphur. The following table exhibits the congealing point of this mixture, when the ingredients are in various proportions, according to Pelletier.

8 Phoſphorus 1 Sulphur	congeals at 77°
8 Phoſphorus 2 Sulphur	——— at 59°
8 Phoſphorus 4 Sulphur	——— at 50°
8 Phoſphorus 8 Sulphur	——— at 41°
4 Phoſphorus 8 Sulphur	——— at 54·5°
2⅔ Phoſphorus 8 Sulphur	——— at 99·5°

This compound, from its extreme inflammability, might, in certain caſes, become a formidable weapon of war.

(685.) We have thus diſcuſſed the inflammable ſolid bodies, which are eſteemed ſimple, or uncompounded, with a few of their combinations. Their combinations with other bodies will be conſidered when we come to treat of the bodies with which they combine.

DIVISION III.

ACIDS.

(686.) The diſcriminating characters of this claſs of bodies are the following.

1. They excite that particular taſte to which we give the name of *acid* or *ſour*.

2. They change blue and purple vegetable colours to a red.

3. They combine with water in almoſt all proportions.

4. They combine with alkalis, with earths, and with metallic oxides, and form compounds which have obtained the name of *ſalts*.

(687.) When vegetable colours are uſed to detect the preſence of acids in liquids, they are called *teſts*. Colours extracted from a great variety of vegetables are uſed for this purpoſe, ſuch as the infuſion and tincture of litmus and of turnſole, the ſyrup of violets, the infuſion of the flowers of mallow, or the juice ſqueezed from the leaves of red cabbage. Any vegetable juice, which poſſeſſes a blue or purple colour, may be employed as a teſt of the preſence of acids. The liquid is either dropped into the juice, which becomes inſtantly red if acid be preſent; or paper which has no alum or ſize in its compoſition, or from which theſe have been extracted by ſoaking the paper in water, being ſtained with the juice, a ſmall ſlip of it immerſed in an acid liquor becomes inſtantly red. This is called *teſt paper;* and it may be made by rubbing a piece of paper with the purple bark of radiſhes; with red cabbage; popples; and a variety of blue and purple flowers.

(688.) Acids are a very important claſs of bodies as chemical agents, and it was by attending to their properties and combinations, that the ſcience of chemiſtry was firſt improved. They are not only of great importance in themſelves, but alſo as they are the inſtruments employed in analyſing and detecting the properties of other bodies.

(689.) Paracelſus ſuppoſed that there was only one acid principle in nature, which communicated taſte and ſolubility to all bodies; and Beccher affirmed that this principle was a combination of earth and water, which he imagined to be elementary bodies. But Lavoiſier has demonſtrated that acidity is cauſed by the combination of oxygen with certain bodies, from which this ſubſtance derives its name, or the *principle of acidity*. Not that oxygen poſſeſſes any acid properties itſelf; but that it communicates theſe properties to certain bodies, when combined with them in ſuitable proportions. All the ſimple combuſtible ſubſtances, except hydrogen, are converted into acids, when they are combined with a ſufficient proportion of oxygen. Four of the metals are alſo converted into acids by combining with oxygen. When the oxygen which cauſed acidity is ſeparated from theſe bodies, their acid properties are extinguiſhed, and they revert to the intermediate ſtate of oxides, or to their original ſtate of ſimple combuſtibles.

(690.) There ſtill, however, remains ſome degree of doubt, whether oxygen be the ſole acidifying principle; or whether other ſubſtances, in certain combinations, may not convey to bodies the acid properties. Thus ſulphureted hydrogen poſſeſſes all the properties of an acid, though no oxygen has been detected in its compoſition. Some think the term *acid* has been taken in too vague and general a ſenſe, and inſiſt the term ſhould be reſtricted to thoſe ſubſtances which combine with alkalis, forming neutral ſalts, in which the individual properties both of the acids and of the alkalis are extinguiſhed.

(691.) The acid whoſe baſes are the three ſimple combuſtibles already deſcribed, are all products of combuſtion, during which oxygen combines with the combuſtible, and cannot afterwards be ſeparated by the ſtrongeſt heat that can be applied. To them the doctrine of Lavoiſier is ſtrictly applicable; and when the ſame baſis forms acids by combining with two doſes of oxygen, the higheſt combination is expreſſed by a word ending in *ic*, and the loweſt by a word ending in *ous*. Thus the greateſt doſe of oxygen combined with ſulphur forms *ſulphuric acid*, and a ſmaller doſe of oxygen, with the ſame baſis, forms *ſulphurous acid*.—The acids whoſe baſes are the three ſimple combuſtibles are

	Names.	Baſes.	proportion of oxygen to 100 of baſe.
1.	Sulphuric,	Sulphur,	71·3
2.	Sulphurous,		47
3.	Phoſphoric,	Phoſphorus,	154
4.	Phoſphorus,		
5.	Carbonic.	Carbon.	257

Sect. I. Sulphuric Acid.

(692.) Though the ancients were acquainted with *alum*, green *vitriol*, and other compounds of this acid, they did not know any thing of the ſulphuric acid in a ſeparate ſtate. It was firſt mentioned by Baſil Valentine, about the end of the 15th century. It was alſo mentioned by Agricola and Paracelſus; but Dornœus firſt deſcribed it diſtincty, in the year 1570.

(663.) As this acid was firſt obtained by diſtillation from *green vitriol*, a ſalt compoſed of ſulphuric acid and iron, it acquired the name of *vitriolic acid;* and the concentrated acid, from its ſluggiſh appearance, was called *oil of vitriol.* It was alſo obtained by burning ſulphur under a glaſs bell, and was hence *called oleum ſulphuris per campanam.* We formerly ſtated that if ſulphur be burnt in a glaſs veſſel containing oxygen gas, it burns with great ſplendor, and while fumes are produced, which being collected among a ſmall quantity of water poured into the jar, are found to be ſulphuric acid. The acid then conſiſting of oxygen united to a baſis of ſulphur, this induced the French chemiſts, in 1787, to aſſign it the name of ſulphuric acid.,

(694.) The mode by which ſulphuric acid is now manufactured, was firſt invented by the late ingenious Dr Roebuck of Hinneil, a man to whom his country is much indebted for many important improvements in the chemical arts. A certain proportion of nitre and ſulphur are well mixed together, and are then deflagrated, or burnt, in chambers lined with lead. The nitre imparts its oxygen to the ſulphur, and oxygen is likewiſe furniſhed by the atmoſpheric air in the chamber. The ſulphurous fumes, during this combuſtion, are converted into ſulphuric acid, which combining with water in the bottom of the chamber, is drawn off in a liquid ſtate.

(695.) The acid thus obtained is weak, being diluted with the water neceſſary to condenſe the fumes. It alſo contains ſome ſulphur that had eſcaped combuſtion; ſulphurous acid; the potaſh in the compoſition of the nitre; and a very minute portion of lead. The ſuperfluous water, and other volatile ingredients, are ſeparated by diſtillation from glaſs retorts placed in ſand-baths. The acid which remains behind, is concentrated and limpid. But to get rid of the fixed impurities, the acid itſelf muſt be diſtilled over. This is done by putting it into a ſmall glaſs retort with a long neck, which may be coated on the outſide with clay, faſtened in an iron ring in a furnace, and ſurrounded with burning charcoal. The acid comes over and is condenſed in a glaſs receiver, whoſe neck ſhould be a little wider than the beak of the retort, to prevent the air from burſting the veſſels. Too much acid ſhould not be put into the retort at a time, as the boiling of this heavy liquor is apt to break the glaſs.

(696.) Sulphuric acid, thus obtained pure, is limpid and colourleſs as water, of an oily conſiſtence, without ſmell, and of a very ſtrong ſour taſte. It ſoon deſtroys the texture of animal and vegetable ſubſtances. It always contains a portion of water, but when concentrated as much as poſſible by evapourating the water, its ſpecific gravity is ſaid to be 2·000; though it is ſeldom denſer than 1·85. It changes all vegetable blues to a red except indigo. It boils, according to Erxleben, at 546°; according to Bergman, at 540°.

(697.) This acid congeals at a low temperature. Mr Keir found that when its ſpecific gravity is 1·780, if freezes at 45°; but in proportion as it is more concentrated, or more diluted than this point, it requires a lower temperature to make it congeal. Morveau froze it at 4° below 0, and it aſſumed the appearance of frozen ſnow. After it has once been frozen it congeals again at a much lower temperature than at firſt. Chaptal cauſed it to congeal in this way at 48°, and it formed groups of cryſtals, conſiſting of flat hexahedral priſms, terminated by a ſix ſided pyramid. When as much concentrated as poſſible, Dr Thomſon found it might be cooled down to 36° below 0, before it congealed.

(698.) Sulphuric acid has a very ſtrong attraction for water, and when highly concentrated, and expoſed to the atmoſphere, it ſoon attracts more than ſix times its own weight of this liquid. Mr Gould having expoſed 180 grains of this acid, not highly concentrated, found it attracted 68 grains of water the firſt day, 58 the ſecond, 39 the third, 23 the fourth 18 the fifth, and ſo on, the quantity attracted diminiſhing every day, until on the 28th day the augmentation was only half a grain. This reſembles other caſes of chemical affinity, the force of which is always diminiſhed in proportion as the bodies approach to the point of ſaturation.

(699.) The affinity between this acid and water is ſtill more ſtriking, when theſe bodies are joined together. If four parts of ſulphuric acid, and one of ice, both at 32°, be joined together, the ice inſtantly melts, and combines, and the temperature of the mixture riſes 212°. But if one part of acid be mixed with four of ice, both at 32°, the mixture ſinks to about 4° below 0. But the higheſt temperature is produced when liquid water is ſuddenly mixed with this acid. An increaſe of temperature takes place at all proportions; but when four parts of acid, and one of water, are mixed together, the mixture riſes to 300°, which is the higheſt. The increaſe of temperature is aſcribed to the two bodies in the mixture occupying a ſmaller bulk than they did when ſeparate, as formerly explained. It was formerly ſtated that when ice becomes liquid it abſorbs caloric. In the firſt example, all the caloric abſorbed by the ice, is not equal to that which is evolved by the mixture; therefore a ſurplus is left to raiſe the temperature of the mixture to 212°. But in the ſecond example the ice being in greater quantity, abſorbs much more caloric while it becomes liquid, than is evolved by the mixture, and hence the temperature ſinks.

(700.) From the water which appears when this acid combines with alkalis and other bodies, there can be no doubt but even that which is concentrated to the utmoſt ſtill contains a conſiderable portion of water. This has led chemiſts to try if it could be aſcertained how much real acid, and how much water, are contained in a given portion of this liquid, of a known ſpecific gravity?—Homberg, Bergman, Wenzel and Wiegleb, have attempted to anſwer this queſtion; but the perſon who ſeems to have come neareſt the truth is Mr Kirwan. His plan is founded on the quantity of the acid, of a known ſpecific gravity, which is neceſſary to ſaturate a given quantity of pure pot-aſh. Having diſſolved 86 grains of pot-aſh in water, and ſaturated it exactly with ſulphuric acid of a given ſpecific gravity (2·00 we may ſuppoſe), he diluted it with water till its ſpecific gravity was 1·013. The whole weight amounted to 3694 grains. Forty five grains of ſulphate of pot-aſh, diſſolved in 1017 grains of diſtilled water, have the ſame ſpecific gravity at the ſame temperature; whence the proportion of ſalt in each was equal. But in the laſt ſolution the quantity of ſalt was $\frac{1}{22{\cdot}6}$ of the whole; therefore the quantity of ſalt in the firſt was $\frac{3694}{22{\cdot}6} = 159{\cdot}52$ grains. Of theſe 86 grains were alkali; and the remainder, or 75·52 grains muſt be acid. But the quantity of acid employed in ſaturating the 86 grains of pot-aſh, was 79 grains; of which there were therefore 6·52 grains which did not combine, and muſt have been pure water. In order to complete the induction, it was neceſſary to aſcertain what proportion of water ſulphate of pot-aſh contains. Mr Kirwan thinks it contains none, becauſe it loſes no weight at any degree of heat below ignition, and when kept red hot for half an hour, it hardly loſt a grain.—To this concluſion we are not diſpoſed to ſubſcribe, becauſe it is known that limeſtone and other bodies retain water at a higher than a red heat. Such inductions can only be conſidered as approximations to truth, and Mr Kirwan concludes that 100 parts of ſulphuric acid, of 2·000 ſpecific gravity, are compoſed pretty nearly of 91·75 pure acid, and 8·25 of water.

(701.) A ſulphuric acid has a very ſtrong attraction for water, and as the denſity of the mixture is always greater than the mean denſity of the ingredients, and is perpetually varying as the proportions of the ingredients is varied, chemiſts have laboured to aſcertain how much real acid exiſts in every compound of ſulphuric acid and water, of inferior ſpecific gravity.

(702.) For the ſolution of this problem we are indebted to Mr Kirwan. Taking ſulphuric acid of 2·000 ſpecific gravity, which is the ſtrongeſt that can be procured, as his ſtandard acid, the object was to aſcertain how much of this ſtandard acid, entered into the compoſition of all mixtures of inferior denſity. From various experiments he inferred that when equal parts of this ſtandard and water were mixed, the denſity of the whole mixture is increaſed by $\frac{1}{75}$th part. Then applying a formula, to be afterwards explained, adopted by Mr Poujet, in calculating the proportions of alcohol and water, in mixtures of various ſpecific gravity, he deduced the increaſe of denſity on mixing various quantities of ſtandard acid and water, as in the following Table.

Parts of Water.	Parts of ſtandard acid.	Increments of denſity.
5	95	0·0252
10	90	0·0479
15	85	0·0679
20	80	0·0856
25	75	0·0999
30	70	0·1119
35	65	0·1213
40	60	0·1279
45	55	0·1319
50	50	0·1331

(703.) The next object to which Mr Kirwan turned his attention was to deduce from theſe increments of denſity, ariſing from mixing various proportions of water, in parts of a hundred, with ſtandard acid of 2·000, the proportion of real acid contained in 100 parts of various mixtures of inferior denſity.

(704.) "By adding, ſays Mr Kirwan, theſe increments to the ſpecific gravities found by calculation, and taking arithmetical mediums for the intermediate quantities of ſtandard, I made out the firſt 50 numbers of the following Table; the remainder was formed by actual obſervation in the following manner, premiſing that the ſpecific gravities were always taken between 59·5° and 60°, or at moſt 60·5° of Farenheit."

(705.) "1ſt, I found by the preceding part of the Table that 100 parts of ſulphuric acid whoſe ſpecific gravity was 1·8472 contained 88·5 parts ſtandard; conſequently 400 grs. of this acid contain 354."

(706.) "2dly, I then took ſix portions of this acid, each containing 400 grs. and added to them as much water as made them contain reſpectively 48· 46· 44· 42· 40· and 38 grains ſtandard. To find the proportion of water that ſhould be added to each portion of acid, in order that it ſhould contain the given proportion of ſtandard, I uſed the following analogy: Let the quantity of water to be added to 400 parts of the acid that the mixture may contain 48 per cent ſtandard be x. Then $400 + x : 354 :: 100 : 48$, then $19200 + 48\,x = 35400$.

And $48\,x = 35400 - 19200 = 16200$. And $x = \frac{16200}{48} = 337{\cdot}5$.

(707.) "In this manner I found the quantities of water to be added to each of the other portions. The mixtures being made, they were ſet by for four days, ſtirring them with a glaſs rod (that remained in them) each day, and the 5th day they were tried; after which the half of each was taken out and as much water added to them, and then ſet by for three days, by which means the ſpecific gravities correſponding to 24· 23· 22· 21· 20· and 19· per cent. ſtandard were found, after which ſix more portions of 400 grains each of the concentrated acid, whoſe ſpecific gravity was 1·8393, were taken, the proper proportion of water added to each, and after three days reſt and repeated agitation, their denſities in temperature 60° were examined as above, by which means the ſpecific gravities correſponding to 36· 34· 32· 30· 28· and 25· per cent ſtandard were obtained, and half theſe portions mixed with half water exhibited, after three days reſt and agitation, the denſities correſponding to 18· 17· 16· 15· 14· and 13· per cent ſtandard in the above temperature. The balance I uſed turned with $\frac{1}{32}$ of a grain when charged with two ounces, and the ſolid employed was a ſmall glaſs ball containing mercury which loſt 27·88 grs. of its weight when weighed in water in temperature 56°, ſuſpended commonly by a horſe-hair, but when dipped in ſtrong nitrous and marine acids it is ſuſpended by a fine gold wire, and then loſt 27·78 grs of its weight in water."

(708.) I alſo examined and rectified, in ſome inſtances, many parts of the firſt 50 numbers of the Table in the ſame manner, but in general I found them juſt."

(709.) Table *of the quantity of* real Sulphuric acid *in* 100 *parts of mixtures of various denſities.*

100 Parts Sp. Gravity.	Real Acid.	100 Parts Sp. Gravity.	Real Acid.
2·0000	89·29	1·6027	58·03
1·9859	88·39	1·5942	57·14
1·9719	87·50	1·5840	56·25
1·9579	86·61	1·5748	55·36+
1·9439	85·71	1·5656	54·46
1·9299	84·82	1·5564	53·57
1·9168	83·93	1·5473	52·68
1·9041	83·04+	1·5385	51·78
1·8914	82·14	1·5272	50·89
1·8787	81·25	1·5202	50·00
1·8660	80·36	1·5112	49·11+
1·8542	79·46	1·5022	48·21
1·8424	78·57	1·4933	47·32
1·8306	77·68	1·4844	46·43
1·8188	76·79+	1·4755	45·53
1·8070	75·89	1·4666	44·64
1·7959	75·—	1·4427	43·75
1·7849	74·11	1·4189	42·86+
1·7738	73·22	1·4099	41·96
1·7629	72·32	1·4010	41·07
1·7519	71·43	1·3875	40·18
1·7416	70·54+	1·3768	39·28
1·7312	69·64	1·3663	38·39
1·7208	68·75	1·3586	37·50
1·7104	67·86	1·3473	36·60
1·7000	66·96	1·3360	35·81
1·6899	66·07	1·3254	34·82
1·6800	65·18	1·3149	33·93
1·6701	64·28	1·3102	33·03
1·6602	63·39	1·3056	32·14
1·6503	62·50	1·2951	31·35
1·6407	61·61	1·2847	30·45
1·6312	60·71	1·2757	29·46
1·6217	59·82	1·2668	28·57
1·6122	58·93	1·2589	27·68+
1·2510	26·78	1·1129	13·39
1·2415	25·89	1·1011	12·50
1·2320	25 —	1·0955	11·60
1·2210	24·10		
1·2101	23·21	1·0896	10·71
1·2009	22·32	1·0833	9·80
1·1918	21·43+	1·0780	8·93+
1·1836	20·53	1·0725	8·03
1·1746	19·64	1·0666	7·14
1·1678	18·75	1·0610	6·25
1·1614	17·85	1·0555	5·35
1·1531	16·96	1·0492	4·46
1·1398	16·07	1·0450	3·57
1·1309	15·18+	1·0396	2·67
1·1208	14·28	1·0343	1·78

(710.) It was formerly ſtated that Lavoiſier aſcertained the proportion of oxygen which enters into the compoſition of ſulphuric acid, by obſerving the quantity of oxygen gas abſorbed during the combuſtion of ſulphur. According to him, ſulphuric acid contains

71 parts ſulphur,
29 oxygen.

100

(711.) But Meſſrs Thenard and Chenevix, endeavoured to aſcertain the proportion of oxygen in the compoſition of this acid, by diſtilling nitric acid from 100 parts of ſulphur, until the latter was changed into an acid by combining with the oxygen in the compoſition of the nitric acid. The ſulphuric acid thus formed, being precipitated by means of barytes, with which it forms an inſoluble compound, they calculated, from the amount of the precipitate, the quantity of acid formed, and the proportion of oxygen in its compoſition. The mean of their reſults follows.

58·4 ſulphur,
41·6 oxygen.

100·0

(712.) Vauquelin aſcertained that ſulphuric acid does not combine with a higher proportion of oxygen, though diſtilled from the black oxide of mangaueſe. It is not altered by light, nor by the greateſt heat to which it has been ſubjected. The ſimple combuſtibles do not act upon it at the ordinary temperature of the atmoſphere; or their action is ſo flow as not to be perceived. But when aſſiſted by heat, theſe bodies decompoſe ſulphuric acid.

(713.) When this acid and ſulphur are boiled together, oxygen is abſorbed by the ſulphur, and the whole is converted into ſulphurous acid. In the ſame manner when phoſphorus is boiled in it, ſulphurous acid is driven off, and phoſphoric acid is formed. If hydrogen gas and ſulphuric acid be conveyed together through a red hot tube of porcelain, the acid is alſo wholly decompoſed. Water is formed, and ſulphur is depoſited.

(714.) Sulphuric acid does not combine with azote; but with muriatic acid it forms a browniſh liquor, which emits denſe corroſive vapours. It abſorbs nitrous gas in conſiderable quantity, and acquires a purpliſh colour. When applied, in a diluted ſtate, to zinc and iron, water is decompoſed, which oxygenates the metals, and hydrogen flies off; while the acid combines with the oxides thus formed. If the acid be concentrated, it is decompoſed, and ſulphurous acid is exhaled. Upon tin and copper this acid does not act except when aſſiſted by heat, when it oxidizes and diſſolves them. Upon other metals it does not act except its temperature be very high. Upon gold and platinum it ſcarcely acts at any temperature.

(715.) It unites with all the alkalis and earths, except ſilica, and with moſt of the metallic oxides. The ſalts thus formed are called *ſulphates*, as *ſulphate of ſoda*, *ſulphate of iron*, &c.

(716.) This acid has the ſtrongeſt affinity for barytes of any known ſubſtance, and forms with it an inſoluble compound. Hence barytes, commonly diſſolved in muriatic acid, forming a ſalt called muriate of barytes, is commonly uſed to detect the preſence of ſulphuric acid in the waters of ſprings, and other liquids. If the acid be looſe and uncombined, the teſts deſcribed (687) will diſcover its preſence. But whether it be combined or not, on dropping in a little muriate of barytes, the barytes will combine with the ſulphuric acid, and carry it to the bottom of the liquor.

(717.) This is one of the moſt important acids with which we are acquainted, not only for the chemiſt, but for medicine, for bleaching, dyeing, and various manufactures. Hence the preparation of it is itſelf a manufacture of great importance.

(718.) The ſubſtances with which this acid combines, follow, in the order of their affinities.

SULPHURIC ACID.

Barytes,
Strontites,
Potaſh,
Soda,
Lime,
Magneſia,
Ammonia,
Glucina,
Yttria,
Alumina,
Zirconia,
Oxide of Zinc,
Iron,
Manganeſe,
Cobalt,
Nickel,
Lead,
Tin,
Copper,
Biſmuth,
Antimony,
Arſenic,
Mercury,
Silver,
Gold,
Platinum.

SECT. II. SULPHUROUS ACID.

(719.) As this acid is formed during the ſlow combuſtion of ſulphur, ſome of its properties muſt have been obſerved from the remoteſt times. Stahl firſt gave it the name of the *phlogiſticated ſulphuric acid*, from an opinion that it was ſulphuric acid combined with phlogiſton. It was not till 1774 that its compoſition and properties were aſcertained by Prieſtley and Lavoiſier. Berthollet, Fourcroy, and Vauquelin have alſo examined its properties, and the compounds it forms with other bodies; ſo that theſe are now well known.

(720.) The ſulphurous acid abounds in Nature, and eſpecially in the neighbourhood of volcanos. It was by vapours that Pliny the naturaliſt was ſuffocated, in the 79th year after the Chriſtian æra, during the eruption of Mount Veſuvius, which overwhelmed Herculaneum. It is emitted in great quantities when certain lavas, pyrites, and other minerals which contain ſulphur, are expoſed to heat in the open air.

(721.) It is formed when ſulphur is ſubjected to ſlow combuſtion in the open air; and in this way, as formerly ſtated, wool and ſilk have been immemorially bleached by being expoſed to its fumes. But it is uſually obtained in a ſtate of purity by decompoſing the ſulphuric acid, or abſtracting from it a part of its oxygen. For this purpoſe two parts of ſulphuric acid, and one part of mercury, are put into a glaſs retort, and the heat of a lamp applied. In this caſe part of the oxygen of the ſulphuric acid combines with the mercury, and the ſulphurous acid eſcapes with efferveſcence. It muſt be received in glaſs jars filled with mercury, and placed in a mercurial trough.

(722.) Sulphurous acid, thus obtained, is in the ſtate of a gas, colourleſs like common air, though it refracts the rays of light. It extinguiſhes combuſtion, and kills animals when reſpired. It firſt reddens, and then gradually deſtroys blue vegetable colours. It deſtroys a great variety of animal and vegetable colours. Hence its uſe in bleaching wool and linens ſtained by the juices of fruits. Its ſpecific gravity is more than double that of common air. According to Kirwan it is 2·265, that of air being 1·000. At the temperature of 60°, and medium altitude of the barometer, 100 cubic inches of this gas weigh 70·215 grains.

(723.) Prieſtley and Berthollet obſerved that when this gas is expoſed to a ſtrong heat in cloſe veſſels, it depoſits ſulphur, and is converted into ſulphuric acid; though the experiment did not ſucceed with Fourcroy and Vauquelin. Clouet and Monge aſcertained that when condenſed, and cooled to 18° below 0, it paſſes into the liquid ſtate. In this reſpect this gas differs from moſt of the other gaſes which retain their elaſtic ſtate at all degrees of condenſation, and at the loweſt temperatures to which they have been ſubjected.

(724.) Sulphurous acid gas combines readily with water. According to Prieſtley 1000 grains of water, of temperature 54·5° abſorb 39·6 grains of this acid. According to Fourcroy, water at 40° abſorbs the third of its weight of this gas. According to Dr Thomſon, 1000 grains of water abſorb 91·5 of this gas, at the temperature of 61°, and barometer 29·55 inches in altitude. Water thus impregnated is of more ſpecific gravity than formerly, being 1·0513 even at the temperature of 68°. This water may be frozen without parting with any of the gas. When heated above 65·25° the gas begins to ſeparate, and to aſſume the elaſtic ſtate. When ice is immerſed in ſulphurous acid gas, it melts and combines, without any ſenſible variation of temperature. This may be added to the objections formerly adduced to the received doctrines concerning the conſtitution of the gaſes.

(725.) When water impregnated with ſulphurous acid is expoſed to the air, it abſorbs oxygen, and is converted into ſulphuric acid. The abſorption is accelerated by agitating the liquor; but ſucceeds moſt rapidly when the ſulphurous acid is combined with an alkali, or with an earth. When a mixture of ſulphurous acid gas and oxygen are made to paſs through a red hot porcelain tube, they combine, and ſulphuric acid is formed.

(726.) Sulphur and phoſphorus have no action on ſulphurous acid. Hydrogen only acts upon it at a red heat. When a mixture of theſe two gaſes is conveyed through a red hot porcelain tube, water is formed, and ſulphur is depoſited. In the ſame way charcoal decompoſes ſulphurous acid gas, forming carbonic acid and ſulphur; though neither of theſe bodies act upon it when cold.

(727.) This acid is not changed by azote, or by muriatic acid.

(728.) It does not oxidize, or diſſolve any of the metals except iron, zinc, and manganeſe.

(729.) It combines with alkalis, earths, and metallic oxides, forming ſalts which have obtained the name of *ſulphites*.

(730.) Sulphurous acid gas is abſorbed by ſulphuric acid in conſiderable quantity. The compound is of a yellowiſh brown colour, ſmokes in the open air, and emits a penetrating ſuffocating odour. By diſtillation the compound of the two acids comes over, and cryſtallizes in long white priſms. Theſe ſmoke in a moiſt atmoſphere, and emit the odour of ſulphurous acid. When the cryſtals are thrown into water, they hiſs like a red hot iron. Theſe cryſtals were formerly called *glacial ſulphuric acid*, and Fourcroy has demonſtrated them to be a compound of the ſulphuric and ſulphurous acids. The ſulphuric ſeparates the ſulphurous acid, in its gaſeous form, from its compounds, and even from water.

(731.) According to Fourcroy, 100 parts of this acid are compoſed of

85	ſulphur,
15	oxygen.
100	

But according to Dr Thomſon,

68	ſulphur,
32	oxygen.
100	

(732.) The following are the affinities of this acid.

Barytes,
Lime,
Potaſh,
Soda,
Strontites,
Magneſia,
Ammonia,
Glucina,
Alumina,
Zirconia.

Sect. III. Nitric Acid.

(733.) We had occaſion to offer ſome remarks upon this acid when treating of the gaſes of which it is compoſed. It was firſt diſcovered by Raymond Lully, who was born at Majorca, 1235, who obtained it by diſtilling a mixture of nitre and clay. It was firſt called *water of nitre*, afterwards *aquafortis* and *ſpirit of nitre*. The French chemiſts, in their new nomenclature, gave it the name of *nitric acid*, in 1787.

(734.) In large manufactories it is procured by diſtilling a mixture of nitre and clay; but the acid thus obtained is impure. Chemiſts obtain it by diſtilling three parts of purified nitre, and one of ſulphuric acid in a glaſs retort. The ſulphuric acid combining with the alkaline baſe of the nitre, ſets looſe the nitric acid, which is evaporated through a glaſs tube luted into a bottle with a double neck, containing a little water to facilitate its condenſation. From the other neck of the bottle there paſſes a bent tube under a pneumatic apparatus, to collect the uncondenſible gaſes. Such apparatus ſhould be furniſhed with a tube of ſafety, which is a tube inſerted in the condenſing bottle, bent and doubled, ſo that its outward limb may receive a column of water. This excludes communication with the external air, while it allows the gaſes to expand and prevents their burſting the veſſels; and if a vacuum ſhould be formed, the air enters by this tube, which might otherwiſe burſt the veſſels by its preſſure. Other tubes of ſafety are inſerted in the neck of the condenſing bottle, having their lower orifice under water. Internal expanſion cauſes the water to riſe in the tube; and if a vacuum ſhould be formed, the external air paſſes thro' the tube and fills the veſſels.

(735.) The nitric acid thus obtained is of a yellow colour, and generally contains a portion of muriatic and ſulphuric acids. By ſlow diſtillation the muriatic acid comes over with the firſt portions. Or if the acid be ſtrong, the muriatic acid may be ſeparated by mixing and diſtilling it from nitrate of ſilver. The ſulphuric acid may be ſeparated by ſlow diſtillation, and rejecting the laſt portions; or by diſtilling it from litharge, or nitrate of barytes.

(736.) When theſe foreign acids are ſeparated, the liquor ſtill retains a yellow colour, and emits red fumes, which are owing to a portion of nitrous gas in union with it. The nitrous gas may be expelled by a gentle heat, in an open veſſel; and the nitric acid remains behind, tranſparent and colourleſs, like water.

(737.) Nitric acid has an acrid and peculiar taſte. It conſtantly emits white fumes which have a very diſagreeable ſmell. It ſtains wood of a yellow colour; and the yellow ſtain it leaves upon the ſkin, does not come off except with the epidermis. By expoſure to light this acid is partially decompoſed. Part of its oxygen eſcapes, and nitrous gas is formed, which cauſes the acid to reſume its yellow colour.

(738.) It attracts water from the atmoſphere, but not ſo powerfully as ſulphuric acid. When the concentrated acid is mixed with water, heat is evolved, owing probably to the mutual concentration of the liquids.

(739.) The ſpecific gravity of the ſtrongeſt nitric acid, according to Rouelle, is 1·583; but at the temperature of 60°, Mr Kirwan could not procure it ſtronger than 1·5543.

(740.) As this acid never has been procured except in union with water, whoſe proportion perpetually varies, it is of great importance to aſcertain the amount of real acid in any liquor of a given ſpecific gravity.—This problem Mr Kirwan has endeavoured to ſolve in the following manner.

(741.) Having dried pure carbonate of ſoda in a red heat, he diſſolved it in water, ſo that 367 grains of the ſolution contained 50·05 of alkali. Nitric acid whoſe ſpecific gravity was 1·2754, which he aſcertained to contain 45·7 *per cent.* of acid of the ſpecific gravity 1·5543, choſen as a ſtandard, was applied to ſaturate the alkali in this ſolution, in the proportion of 147 grains of acid, to 367 grains of ſolution. The carbonic acid which was expelled amounted to 14 grains. Having added 939 grains of water, the ſpecific gravity of the ſolution, at the temperature of 58·5°, was 1·0401. Having formed a ſolution of dried nitrate of ſoda, of the ſame ſpecific gravity, and compared theſe two, as deſcribed under the article of ſulphuric acid, he found that the ſalt contained in it amounted to $\frac{1}{16\cdot901}$ of the whole. The acid was in exceſs to the amount of about 2 grains. The weight of the whole was 1439 grains: conſequently the quantity of ſalt was $\frac{1439}{16\cdot901} =$ 85·142 grains. The quantity of alkali was 50·05 — 14 = 36·05. As of 102·35 grains of acid, only 85·142 grains entered into the compoſition of the ſalt, he inferred that the remaining 17·608 muſt have been pure water combined with the nitric acid. Hence 100 parts of this acid muſt contain 26·38 parts of water.

(742.) Mr Kirwan therefore inferred that 100 parts of this ſtandard acid are compoſed of 73·62 parts of pure acid, and 26·38 of water.—It is evident that ſuch concluſions can only approximate to truth. It is not certain but that the carbonate and nitrate of ſoda, though dried in the way deſcribed, may ſtill contain ſome water, though Mr Kirwan has rendered it probable that they contain very little. His real acid muſt be underſtood to be nitric acid of that degree of ſtrength, which enters into the compoſition of nitrate of ſoda. The proportion of this real acid contained in nitric acid liquors, of various ſpecific gravities, Mr Kirwan has exhibited in the following

TABLE.

100 Parts Sp. Gravity.	Real Acid.	100 Parts Sp. Gravity.	Real Acid.
1·5543	73·54	1·4707	64·71
1·5295	69·86	1·4695	63·98 +
1·5183	69·12	1·4683	63·24
1·5070	68·39	1·4671	62·51
1·4957	67·65	1·4640	61·77
1·4844	66·92	1·4611	61·03
1·4731	66·18	1·4582	60·30
1·4719	65·45	1·4553	59·56
1·4524	58·83	1·2812	35·30 +
1·4471	58·09	1·2795	34·56
1·4422	57·36	1·2779	33·82
1·4373	56·62		
1·4324	55·89	1·2687	33·09
1·4275	55·15	1·2586	32·35
1·4222	54·12 +	1·2500	31·62
1·4171	53·68	1·2464	30·88
1·4120	52·94	1·2419	30·15
1·4069	52·21	1·2374	29·41
1·4018	51·47	1·2291	29·68
1·3975	50·74	1·2209	27·94
1·3925	50·00	1·2180	27·21 +
1·3875	49·27	1·2152	26·47
1·3825	48·53	1·2033	25·74 +
1·3775	47·80	1·2015	25·00
1·3721	47·06	1·1903	24·26
1·3671	46·33	1·1911	23·53
1·3621	45·59	1·1845	22·79
1·3571	44·86 +	1·1779	22·06
1·3521	44·12	1·1704	21·32
1·3468	43·38	1·1629	20·59
1·3417	42·65	1·1581	19·85
1·3364	41·91	1·1524	19·12
1·3315	41·18	1·1421	18·48
1·3264	40·44	1·1319	17·60 +
1·3212	39·71	1·1284	16·91
1·3160	38·97	1·1241	16·17
1·3108	38·34	1·1165	15·44
1·3056	37·50	1·1111	14·70
1·3004	36·77	1·1040	13·27
1·2911	36·03		

(743.) The ingenious Mr Davy has attempted to aſcertain the proportions of water in union with nitric acid, by ſaturating nitrous gas with oxygen gas, by which he ſuppoſes the pure acid to be produced. This acid remains in the ſtate of vapour; but by mixing it with various proportions of water, and aſcertaining the ſpecific gravity of each mixture, he deduces the proportion of pure acid in watery compounds of various ſpecific gravities.—It is however evident that his ſtandard acid is not pure, but contains a portion of nitrous gas. His concluſions are exhibited in the following

TABLE.

100 Parts Nitric Acid, of Sp. Gr.	True Acid.	Water.
1·5040	91·55	8·45
1·4475	80·39	19·61
1·4285	71·65	28·35
1·3906	62·96	37·04
1·3551	56·88	43·12
1·3186	52·03	47·97
1·3042	49·04	50·96
1·2831	46·03	53·97
1·2090	45·27	54·73

(744.) Nitric acid boils at 248°, and evaporates without charge. But if it be paſſed through a red hot porcelain tube it is decompoſed into oxygen and azotic gas. When cooled to 66° below o, it begins to congeal, and by agitation acquires the conſiſtence of butter. When weak nitric acid is diſtilled, the weakeſt comes off firſt; but if it be concentrated, the ſtrongeſt comes off firſt.

(745.) Oxygen gas does not combine with nitric acid; but it is decompoſed by all the ſimple combuſtibles, except the diamond. At a high temperature, it converts them ſlowly into acids, while nitrous gas is exhaled. Charcoal which is perfectly dry, and reduced to powder, it alſo inflames at a high temperature. Hydrogen gas does not act upon it, unleſs both be paſſed through a red hot tube, when they detonate with great violence; water is formed, and azotic gas evolved.

(746.) Nitric acid when poured in, readily ſets fire to oil of turpentine, and the claſs of oils which are called drying, or volatile. In order that it may ſet fire to the fat oils, it is neceſſary that a portion of ſulphuric acid be mixed with it, which, it is ſuppoſed, abſorbs the water from the nitric acid or from the oils. In this proceſs there is a mutual decompoſition both of the acid and of the oil. The oxygen of the acid combines both with the carbon and with the hydrogen of the oil, and heat is evolved. We formerly quoted this acid as an example of a body compoſed of two gaſes, which retains much caloric under the liquid, and even the ſolid form.

(747.) Nitric acid is not changed by azote; but is partly decompoſed by muriatic acid. A mixture of nitric and muriatic acid was formerly known by the name of *aqua regia*, becauſe it was long the only known ſolvent of gold. This mixture is now called *nitro-muriatic acid*.

(748.) This acid oxidizes all the metals except gold, platinum, and titanium. Bergman and others aſſert it can diſſolve, and hence oxidize, a very minute portion even of gold. But this may have been owing to a minute portion of muriatic acid in its compoſition.

(749.) If it be poured upon zinc, biſmuth, and tin, while they are in fuſion, it ſets them on fire. It alſo fires iron filings if they be perfectly dry.

(750.) The ſalts formed by the combination of this acid with alkalis, earths, and the oxides of metals, are called *nitrates*.

(751.) This acid is of the higheſt importance both to the inveſtigations of chemiſtry, and to the arts. Being an eſſential ingredient in the compoſition of gun-powder, its conſtituents and properties have attracted more than ordinary attention. It is much uſed in medicine, in cutaneous and other diſeaſes. It has lately been adminiſtered, in a diluted ſtate, in venereal complaints, and may prove an uſeful auxiliary to other remedies. Its fumes have been found effectual in expelling peſtilential infection from ſhips, and other places.

(752.) According to Mr Cavendiſh, nitric acid is compoſed of

29·77 azote,
70·23 oxygen.

100·00

(753.) The following is the order of the affinities of nitric acid.

Barytes,
Potaſh,
Soda,
Strontites,
Lime,
Magneſia,
Ammonia,
Glucina,
Alumina,
Zirconia,
Oxide of Zinc,
—— Iron,
—— Mangeneſe,
—— Cobalt,
—— Nickel,
—— Lead,
—— Tin,
—— Copper,
—— Biſmuth,
—— Antimony,
—— Arſenic,
—— Mercury,
—— Silver,
—— Gold,
—— Platinum.

SECT. IV. NITROUS ACID.

(754.) Nitrous gas combines in conſiderable proportion with nitric acid, and conveys to it a deep orange colour, which varies in intenſity according to the proportion of the gas in combination, and even varies to green and other colours according to the proportions of water combined with the acid. The common *aqua fortis* of commerce is nitric acid combined with nitrous gas. To produce this combination, it is only neceſſary to paſs the nitrous gas through nitric acid from the beak of a retort. Or if the lower ſtratum of nitric acid be decompoſed by a piece of metal, the upper part becomes yellow by combining with the nitrous gas which is thus generated. The ſame effect takes place when nitric acid is expoſed to light, which cauſes part of its oxygen to fly off, and leaves nitrous gas in union with the undecompoſed portion of the nitric acid.

(755.) The yellow acid, which emits red vapours, has long obtained the name of NITROUS ACID, and Lavoiſier and his colleagues who framed the new nomenclature, ſuppoſed it to bear the ſame relation to nitric acid, which ſulphurous acid bears to the ſulphuric. They ſuppoſed it to be an acid of the ſame baſis with the nitric, but containing a ſmaller proportion of oxygen in its compoſition.

(756.) But Meſſrs Davy and Thomſon, who have examined this ſubject with their uſual accuracy, have demonſtrated that the yellow fuming acid is a combination of the nitric acid with nitrous gas, a body which has no acid properties whatever; and that theſe two can be ſeparated by diſtillation, the reſiduum being true nitric acid. The yellow fuming acid alſo forms the ſame ſalts with different baſes, that are formed by uniting the nitric acid with theſe baſes.

(757.) But when the ſalt called nitre is expoſed to a red heat for ſome time, it emits a conſiderable portion of oxygen gas, derived from the decompoſition

compoſition of the nitric acid of the ſalt. When this proceſs is ſtopped in time, the qualities of the ſalt are found to be changed, as it now conſiſts of potaſh united to nitrous acid, or nitric acid deprived of a part of its oxygen. When any acid is added to this ſalt, fumes of nitrous vapour are diſengaged; and Dr Thomſon thinks it probable that the nitrous acid in its compoſition, cannot be obtained in a ſeparate ſtate. Nitrous acid then, as far as we know, exiſts only in union with a baſe, and is formed by expoſing the ſalts into whoſe compoſition nitric acid enters, to a ſlow and graduated heat.

(758.) The ſalts whoſe nitric acid has thus been deprived of a part of its oxygen, and has been converted into nitrous acid, are called *nitrites*.

Sect. V. Muriatic Acid.

(759.) This acid, as hinted when treating of the gaſes, when pure and uncombined, always exiſts in the form of a gas. To obtain it in this ſtate, equal weights of common ſalt, and of ſulphuric acid, are put into a ſmall retort, the beak of which being plunged under the ſurface of mercury in a ſmall mercurial trough, until the common air in the veſſel be expelled; is then placed under a jar filled with mercury, and the heat of a lamp applied to the retort. A violent efferveſcence enſues, and the muriatic acid gas riſes and diſplaces the mercury from the jar, and occupies its place.

(760.) This muriatic acid gas is inviſible and elaſtic like common air. At 60° of temperature, and barometer 30 inches, its ſpecific gravity, according to Kirwan, is 1·929, that of air being 1·000. 100 cubic inches of it weigh 59·8 grians. It has a very pungent ſmell, and an exceſſively ſour taſte. It extinguiſhes combuſtion, and animals which breathe it die inſtantly of convulſions. But when a burning taper is immerſed in it, the flame before it goes out, aſſumes a green colour. If allowed to come in contact with atmoſpheric air, it aſſumes a white colour, which is owing to water which it abſorbs from the atmoſphere, for which it has a ſtrong attraction. If a little of the blue juice obtained by boiling the leaves of red cabbages in a tin veſſel, be let up into this gas, it ſuddenly aſſumes a bright red colour. This is eſteemed an infallible teſt of acids.

(761.) If a little water be let up into the jar filled with muriatic acid gas, the gas ſuddenly diſappears, and the mercury riſes and fills the jar. In fact the gas combines with the water, for which it has a very ſtrong attraction, and forms with it the liquid muriatic acid. From its ſtrong attraction for water, this acid cannot be obtained in the form of a gas in veſſels where water is preſent; and hence the neceſſity of a mercurial trough for this purpoſe.

(762.) The liquid muriatic acid was known to the alchemiſts, and was firſt extracted from common ſalt, by means of ſulphuric acid, by Glauber. It was hence called *ſpirit of ſalt*, *marine acid*; and is now generally known by the name of *muriatic acid*, from *muria*, which means the acid of *ſea ſalt*. It is prepared for commercial purpoſes by mixing one part of common ſalt with ſeven or eight of clay, and diſtilling the mixture. Thoſe clays which contain a portion of ſulphuric acid in their compoſition, anſwer beſt for this purpoſe. Or it is prepared by diſtilling equal weights of common ſalt and ſulphuric acid: the product in both caſes being received in a veſſel containing water.

(763.) For chemical purpoſes, muriatic acid is prepared in the following manner. 100 parts of dry common ſalt are put into a glaſs matraſs, to which is luted a bent glaſs tube which paſſes into a ſmall Wolfe's bottle. From this bottle another bent tube paſſes into a larger glaſs receiver, which has a quantity of water put into it, equal in weight to that of the ſalt put into the matraſs. Through a ſeparate mouth in the matraſs, 75 parts of ſulphuric acid are poured in upon the common ſalt, and the mouth tightly cloſed with a glaſs ſtopper. The matraſs is then expoſed to a ſlowly increaſing heat. The ſulphuric acid combines with the ſoda, or baſe of the common ſalt, and diſplaces the muriatic acid, which the heat cauſes to paſs over in the ſtate of a gas into the large receiver, where it is abſorbed, and combines with the water. If any ſulphuric acid ſhould riſe, in conſequence of the heat, it is condenſed in the ſmall Wolfe's bottle, Or the muriatic acid may be ſeparated from any minute mixture of ſulphuric acid, by diſtilling it a ſecond time from common ſea ſalt.

(764.) At the temperature of 60°, barometer 29·4 inches, a cubic inch of water abſorbs 515 inches of muriatic acid gas, or nearly 308 grains. Hence water thus impregnated contains 0·548, or more than half its weight of muriatic acid. But as the gas is always eſcaping from water highly ſaturated, Dr Thomſon found the ſpecific gravity of this liquid to be only 1·203. Ice abſorbs this gas, and at the ſame time liquifies. While abſorbing this gas, water becomes hot, and at the boiling point it abſorbs no more. At every intermediate point, the abſorption is leſs as the heat increaſes. Hence to produce the greateſt poſſible impregnation of this gas with water, the receiver ſhould be ſurrounded with ſnow, or a freezing mixture to diminiſh the heat of the water. Heat ſlowly applied expels the gas from water without change.

(765.) Liquid muriatic acid, thus obtained, is limpid; has the pungent ſmell and taſte of the gas; and when expoſed to the air conſtantly emits white fumes. The yellow muriatic acid of commerce owes its colour to a minute portion of iron diſſolved in it.

(766.) As this acid is chiefly uſed in its liquid form, or when the acid gas is combined with water, it is of importance to know the proportion of real acid, in acid liquors of different ſpecific gravities. The ſtrongeſt muriatic acid that can be preſerved and uſed with advantage, is 1·196 of ſpecific gravity. Taking this as the higheſt uſeful ſtrength of the acid, Mr Kirwan, by experiment and calculation, aſcertained the quantity of real acid in 100 parts of liquors of lower ſpecific gravity, as in the following

TABLE.

100 Parts Sp. Gravity.	Real Acid.	100 Parts Sp. Gravity.	Real Acid.
1·196	25·28	1·1282	16·51
1·191	24·76	1·1244	15·99
1·187	24·25	1·1206	15·48
1·183	23·73	1·1168	14·96
1·179	23·22	1·1120	14·44
1·175	22·70	1·1078	13·93
1·171	22·18	1·1056	13·41
1·167	21·67	1·0984	12·90
1·163	21·15	1·0942	12·[illegible]8
1·159	20·64	1·0910	11·86
1·155	20·12	1·0868	11·35
1·151	19·60	1·0826	10·83
1·147	19·09	1·0784	10·32
1·1414	18·57	1·0742	9·80
1·1396	18·06	1·0630	8·25
1·1358	17·54	1·0345	5·16
1·1320	17·02	1·0169	2·58

(767.) Muriatic acid is not known to exert any action on hydrogen, charcoal, phoſphorus, ſulphur, or any of the ſimple combuſtibles.

(768.) When mixed with nitric acid, it forms the *aqua regia* formerly deſcribed, but now called *nitro-muriatic-acid.* In this caſe the muriatic acid ſeizes part of the oxygen of the nitric acid, producing an efferveſcence with yellow fumes. The nitrous gas thus produced, conveys to the liquor a bright orange colour. The action of *nitro-muriatic acid* upon metals, will be afterwards deſcribed.

(769.) The ſulphuric acid ſeparates the muriatic acid from its compounds, and even from water; but the muriatic expels the ſulphurous acid from this liquid.

(770.) The bulk of muriatic acid gas is greatly diminiſhed by paſſing electric exploſions through it. Mr Henry has ſhewn that this is owing to the decompoſition of water which the gas holds in ſolution, and when all the water is decompoſed, no farther diminution takes place. The oxygen of the water combines with the muriatic acid gas, converting it into *oxymuriatic acid*, while the hydrogen eſcapes.

(771.) Muriatic acid gas neutralizes putrid exhalations, and the miaſmata which occaſion peſtilential diſeaſes. This was firſt ſhewn by Morveau, in 1773, who purified the cathedral church of Dijon in this manner, when it had been ſo much infeſted by putrid exhalations, that after ſeveral unſucceſsful attempts to purify it, the people had abandoned it for ſome time. Having placed a glaſs baſon, containing ſix pounds of common ſalt on a few live coals, in the middle of the church, he poured upon the ſalt two pounds of ſulphuric acid; and immediately retired and cloſed all the doors of the church during twelve hours. The muriatic acid gas filled the whole houſe; and after the doors had been opened, and the gas driven away by currents of air, no putrid odours remained. The ſame method has been ſucceſsfully employed in purifying houſes and ſhips from the infection of the yellow fever, and other peſtilential diſeaſes. For this purpoſe, ſome think nitrous acid gas expelled from nitre, by a ſimilar proceſs, to be more effectual.

(772.) According to the exiſting rules of Chemiſtry, the muriatic acid ought to be ranked as a ſimple ſubſtance, becauſe no one has ſucceeded in decompoſing it; nor is its baſis known; nor whether it derives its acid properties from oxygen in its compoſition. It is true the late Dr Irvine, the laſt of a ſeries of diſtinguiſhed characters who formerly flouriſhed in that modern Pandemonium, the College of Glaſgow, often aſſured the author of this article that he had ſucceeded in decompoſing, or as it was then expreſſed, in *phlogiſticating* the muriatic acid, by mere accident. He had been engaged in a very long and laborious inveſtigation, which had other objects in view, and in which muriatic acid was his principal agent. Having completed his experiments, there remained a ſubſtance of a ſweetiſh taſte, of the colour and conſiſtence of honey. This was put into an open phial, labelled, and placed in the window of his laboratory, that he might afterwards examine it at his leiſure. But ſome time after, he was much ſurpriſed to find it converted into ſmoaking muriatic acid of great ſtrength. This the doctor aſcribed to its having been dephlogiſticated by the action of the rays of light; and he entertained no doubt but the ſubſtance he had put into the phial was the muriatic acid combined with phlogiſton, or what would now be called its *baſis.* Not having noted all the ſteps of his experiments, though he often tried to obtain the ſame reſult, he never was able to ſucceed. Perhaps the ſolution of this problem is reſerved for Mr Davy of the Royal Inſtitution, by means of the powerful Galvanic battery, of which he has the command.

(773.) The ſalts formed by uniting muriatic acid with alkalis, earths, and metallic oxides, are called *muriates.*

(774.) The following is the order of the affinities of this acid.

Barytes,
Potaſh,
Soda,
Strontites,
Lime,
Ammonia,
Glucina,
Alumina,
Metallic oxides.

SECT. VI. OXYMURIATIC ACID.

(775.) We owe the diſcovery of this acid to Scheele, who firſt obtained it in 1774, by pouring muriatic acid upon black oxide of mangaueſe. By the aſſiſtance of heat a gas comes over, which may be received over water. Scheele obſerved that this gas deſtroys vegetable colours, and he gave it the name of *dephlogiſticated muriatic acid*, though it is now known by the name of *oxy-muriatic acid.*

(776.) This gas is of a yellowiſh green colour, of a moſt diſagreeable and deleterious odour, and it combines readily, though in ſmall proportion, with water. When we come to treat of the ſalts it forms with different baſes, we ſhall point out its uſes in bleaching.

(778.) For this purpoſe it is commonly prepared by taking three parts of common ſalt, and one of the black oxide of manganeſe, reduced to powder, and well mixed. Theſe being put into a tubulated retort of glaſs, or lead, placed in a ſand-bath, have two parts of ſulphuric acid, diluted with water, poured upon them, and the aperture is cloſely ſtopped. An efferveſcence enſues, and the gas paſſes through a tube of glaſs, or lead, into a trough, where it may be received in jars over water. Here the ſulphuric acid diſengages the muriatic acid from its alkaline baſis, and alſo oxygen from the metallic baſis of the manganeſe. The oxygen and muriatic acid combining in the inſtant of their diſengagement, form the oxymuriatic acid gas.

(779.) Though this gas excites violent coughing, and proves deſtructive when reſpired, yet it ſupports combuſtion. A taper burns rapidly in it, with a diminiſhed but red flame, and much ſmoke is emitted. It is not altered by light or heat, and it paſſes unchanged through a red hot porcelain tube.

(780.) It does not act upon oxygen, or azote. Hydrogen gas, mixed with this gas, does not act upon it when cold. But if the mixture be paſſed through a red hot porcelain tube, a violent detonation enſues. It is alſo very probable, though it has not been tried, that were a mixture of hydrogen and oxy-muriatic gas ſufficiently compreſſed, they would explode with violence.

(781.) This gas does not act upon charcoal, when cold. But when a mixture of equal bulks of this and of carbonated hydrogen gas are inflamed, the hydrogen gas only burns, and is converted into water, by combining with the oxygen of the oxy-muriatic gas, while charcoal is depoſited. Two meaſures of oxy-muriatic gas, and one of carbonated hydrogen gas, being mixed and kept in a cloſe phial, they decompoſe each other in abont 24 hours. The products are muriatic acid, water, carbonic acid, and gaſeous oxide of carbon. If the mixture be put in a jar over water, the whole or greateſt part of theſe products are abſorbed, and the water riſes and nearly fills the jar.

(782.) Dried phoſphorus takes fire in this gas, and is converted into phoſphoric acid, by combining with its oxygen. Phoſphoreted hydrogen gas alſo takes fire when mixed with this gas, even after it has loſt the property of ſpontaneous inflammation in the air.

(783.) Sulphureted hydrogen gas is decompoſed in this gas, and ſulphur depoſited. When melted ſulphur is plunged into oxy-muriatic gas, it takes fire, and is converted into ſulphuric acid. Sulphurous acid gas, when mixed with it, forms a white cloud, and is converted into ſulphuric acid. Nitrous gas is reddened, and converted into nitrous acid.

(784.) If a ſtream of oxy-muriatic acid gas be made to paſs over the flowers of ſulphur, in a Wolfe's bottle, Dr Thomſon found the ſulphur was converted into an oxide, by combining with oxygen, while the muriatic acid combined with this oxide, forming *ſulphuret of muriatic acid*. This preparation is liquid, of a bright red colour, intermediate between ſcarlet and crimſon. It evaporates with a moderate heat, ſmokes in the open air, and has a ſtrong ſmell of ſea-plants. If affects the eyes like the ſmoke of peat or wood; taſtes acid, hot, and bitter, and reddens vegetable blues. When dropped into water, the ſurface is covered with a film of ſulphur, and drops deſcend to the bottom reſembling oil, which conſolidate into yellow flakes of an acid taſte. When thrown into warm nitric acid, a very violent efferveſcence, or even exploſion takes place. When ſlowly dropped into cold nitric acid, the efferveſcence is more moderate; nitrous gas, and oxy-muriatic gas being evolved. It readily combines with phoſphorus, forming a compound of a fine amber colour; from which the ſulphuret of muriatic acid may be evaporated, leaving the phoſphorus and a little ſulphur, which take fire. When this ſolution is mixed with a little potaſh, the whole becomes beautifully luminous, and phoſphuret of ſulphur is precipitated.

(785.) According to Dr Thomſon's analyſis, this preparation is compoſed of

44·00	oxide of ſulphur
35·75	muriatic acid
20·25	loſs
100·00	

(786.) Oxy-muriatic acid gas combines with water, according to Berthollet in proportion of 1·6 gr. of the gas to a cubic inch of water. But the quantity abſorbed by water depends upon the temperature and the preſſure. Water impregnated with this gas is of a pale green colour, exhales the peculiar odour of the gas, and was firſt uſed as a bleaching liquor. When the veſſels containing water, and receiving this gas, are ſurrounded with ice, the gas cryſtallizes at the ſurface and bottom, in the form of ſix-ſided plates, of a greeniſh white colour, which the ſlighteſt heat cauſes to reſume the gaſeous form. Water ſaturated with this gas, at the temperature of 43°, has the ſpecific gravity of 1·003.

(787.) It ſeems doubtful whether this gas ought to be ranked in the claſs of acids. It does not change vegetable blues to red, but deſtroys vegetable colours entirely. Hence its uſe in bleaching; and during this proceſs its oxygen combines with the colouring matter of the cloth, and the oxy-muriatic is converted into the muriatic acid.

(788.) Light decompoſes oxy-muriatic acid, the oxygen ſeparating, and leaving muriatic acid. But when expoſed to heat it evaporates without any apparent ſeparation of its oxygen.

(789.) According to Berthollet, oxy-muriatic acid is compoſed of about

89	muriatic acid
11	oxygen
100	

But according to the later analyſis of Mr Chenevix,

77·5	muriatic acid
22·5	oxygen
100·0	

Sect. VII. Hyper-Oxymuriatic Acid.

(790.) This conſiſts of the muriatic acid combined with a much larger proportion of oxygen than enters into the compoſition of the preceding gas. It has not yet been found in a ſeparate uncombined ſtate, and is only known to exiſt in union with other bodies.

(791.) If potaſh be diſſolved in ſix times its weight of water, and have a ſtream of oxymuriatic acid gas conveyed through it, in a Wolfe's bottle, or in the apparatus uſed for preparing the bleaching liquor, until the potaſh be ſaturated; cryſtals are depoſited in the form of fine white ſcales. Theſe cryſtals are called *hyperoxygeniſed muriate of potaſh*. The remaining liquor, when evapourated to dryneſs, is found to contain *muriate of potaſh*; or a ſalt compoſed of the unoxygenized muriatic acid in union with potaſh.

(792.) Theſe facts led Berthollet to ſuppoſe that during the proceſs the oxymuriatic acid gas was decompoſed. That part of it gave off its oxygen, and returned to the ſtate of common muriatic acid; while the other part, combining with this exceſs of oxygen, was converted into hyperoxymuriatic acid, in union with another portion of the potaſh.

(793.) Mr Chenevix expoſed 100 grains of hyperoxymuriate of potaſh to heat, and found it loſt 2·5 per cent. of its weight of water. When heated to redneſs, a violent efferveſcence enſued, and 112·5 cubic inches of oxygen gas, or 38·3 grains came off. The remaining ſalt amounted 53·5 grains, and 5 grains had been evapourated during the proceſs. Hence he concluded that hyperoxymuriate of potaſh conſiſts of

2·5 water,
38·3 oxygen,
58·5 muriate of potaſh.
———
99·3

(794.) From theſe data Mr Chenevix calculated that the hyperoxymuriatic acid, as it exiſts in union with potaſh, is compoſed of about

66 oxygen,
34 muriatic acid.
——
100

(795.) Hence the muriatic acid is found to combine with two doſes of oxygen. With the firſt or loweſt doſe, it forms oxymuriatic acid; with the ſecond it forms hyperoxymuriatic acid. The ſecond contains nearly nine times as much oxygen as the firſt, for

Oxymuriatic acid contains 22 per cent. oxygen
Hyperoxymuriatic acid - 66 ditto.

(796.) This acid combines with alkalis, earths, and metallic oxides, forming ſalts of very peculiar properties, which ſhall afterwards be examined in their order. Hyperoxymuriate of potaſh acts with great energy on combuſtible bodies, and is a powerful ſupporter of combuſtion.

(797.) The order of the affinities of hyperoxymuriatic acid, according to Mr Chenevix, is the following;

Potaſh,
Soda,
Barytes,
Strontites,
Lime,
Ammonia,
Magneſia,
Alumina.

Sect. VIII. Fluoric Acid.

(798.) This acid, like the muriatic, has not yet been decompoſed, and according to the received rules of chemiſtry, ought to be claſſed as a ſimple ſubſtance. But as many of the acids have been decompoſed, and found to conſiſt of oxygen united to ſome baſis, it has been inferred, however erroneouſly, that all acids conſiſt of oxygen united to ſome baſis.

(799.) Fluoric acid was diſcovered by Scheele in 1771, and its properties were more fully aſcertained by Prieſtley and other chemiſts. Margraaf had previouſly diſtilled equal parts of ſulphuric acid and fluor ſpar, and obtained a white ſublimate, while his glaſs retort was much corroded and pierced with holes. Scheele afterwards proved that the fluor ſpar (known in this country by the name of *Derbyſhire ſpar*) is compoſed of this peculiar acid, united to lime.

(800.) To obtain fluoric acid, equal parts of fluor ſpar in powder, and of ſulphuric acid, are put into a retort of lead or tin; but retorts of platinum or of ſilver anſwer beſt, as the acid diſſolves a portion of the former metals. A very gentle heat being applied to the retort, a gas iſſues from it, which may be received in jars over mercury. This gas is *fluoric acid*.

(801.) If a receiver containing water be luted to the retort, the fluoric acid gas will combine with the water, and the acid will be obtained in a liquid form. But a very gentle heat muſt be applied, both to allow the gas to condenſe, and to prevent the fluor ſpar itſelf from coming over. If a glaſs retort has been uſed, a cruſt of ſilicious earth will be found in the retort.

(802.) The moſt remarkable property of this acid is its corroding glaſs, and diſſolving ſilicious earth when it comes in contact with it, and holding it in ſolution even in its gaſeous form, ſo that it is very difficult to obtain the gas wholly free of ſilica.

(803.) Fluoric acid gas is inviſible and elaſtic like air. It kills animals when reſpired, and extinguiſhes combuſtion. It is heavier than common air, and attracts moiſture from the atmoſphere, which converts it into a white vapour. It rapidly corrodes the ſkin, and has a pungent ſmell not unlike that of muriatic acid. It is not altered by light or heat.

(804.) This gas is abſorbed by water in conſiderable quantity, though the proportion has not been aſcertained. The liquid thus formed is called *fluoric acid* by chemiſts. If the gas has been in contact with glaſs, or ſilica, it depoſits ſilicious earth when it unites with water; but not otherwiſe. The liquid acid is heavier than water, reddens vegetable blues, has a ſour taſte, and freezes at 23°. Great part of the acid gas may be ſeparated from water by heat, though the laſt portions adhere obſtinately.

(805.) Fluoric acid is not altered by oxygen, or any of the combuſtible bodies. The gas does not act upon any of the metals; but the liquid acid oxidizes iron, zinc, copper and arſenic. It does not act upon gold, platinum, ſilver, mercury, lead, tin, antimony, cobalt. It combines with alkalis, earths, and metallic oxides, forming with them ſalts which have obtained the name of *fluates*.—The other acids produce no known change upon the fluoric.

(806.) As fluoric acid forms an inſoluble compound with lime, it has been propoſed to employ it to detect the preſence of lime in the waters of ſprings, and other liquids. If lime be preſent, a few drops of this acid carry it down to the bottom in the form of a white cloud.

(807.) The remarkable property of this acid, both in its gaſeous and liquid form, and eſpecially when heated, of diſſolving glaſs and ſilica, has been taken advantage of in order to engrave, or rather to etch figures upon glaſs. It has been employed to write labels upon bottles; to divide thermometers; to draw landſkips and other figures on looking glaſſes; and for other ſimilar purpoſes. The ingenious Mr Crighton at Glaſgow tried to ſubſtitute plates of glaſs etched by the fluoric acid, in place of the copperplates uſed in throwing off prints. Though ſeveral elegant prints were thrown off in this way, the plates were found too liable to break.

(808.) In this mode of etching, the glaſs is firſt wholly coated over with wax, on which the figures are ſcratched by a ſharp inſtrument, which removes the wax from the parts on which the acid is to act. The glaſs is then expoſed to a current of the fluoric acid gas, which corrodes thoſe parts of it from which the wax had been removed, and leaves the ſame figures on the glaſs which had been formed on the wax.—It appears that this mode of etching had been known to Henry Swanhard, an artiſt of Nuremberg, as early as 1670. His mode ſeems to have been firſt to form the figures on glaſs, with ſulphur and varniſh, and having raiſed a cup of wax around the figure, he poured into it the liquid acid, and left it to corrode the glaſs without diſturbance.

(809. The order of the affinities of fluoric acid is as follows:

Lime,
Barytes,
Strontites,
Magneſia,
Potaſh,
Soda,
Ammonia,
Glucina,
Alumina,
Zirconia,
Silica.

Sect. IX. Boracic Acid.

(810.) The component parts of this acid are not yet diſtinctly aſcertained. Combined with ſoda it conſtitutes the ſalt called *Borax* of the ſhops, which is brought from the Eaſt Indies, and is much uſed in ſoldering metals, and other chemical operations.

(811.) Borax ſeems to exiſt in lands contiguous to certain lakes in Thibet, and when theſe lakes become ſhallow during the heat of ſummer, it is extracted from their bottom in large lumps. Sometimes the water of the lakes is admitted into reſervoirs, and being evapourated by the ſun's rays, Borax is depoſited. In other parts of Thibet it is dug out of the ground, at the depth of about two yards, in ſmall cryſtalline maſſes, called by the Chineſe *mi poun*, *houi poun*, and *pin poun*; and the earth in which it is found is called *pounxa*. This being carried to the Eaſt Indies is ſomewhat purified, and is called *tincal*; and in this ſtate it is brought to Europe.

(812.) To procure boracic acid, diſſolve borax in hot water, and add ſulphuric acid by little and little until the liquor acquires a ſenſibly acid taſte. The ſulphuric acid combines with the ſoda, and diſengages the boracic acid. The liquor being ſet aſide to cool, the boracic acid conſolidates into a great number of ſmall ſhining laminated cryſtals. Theſe muſt be waſhed with cold water, to extract the ſulphate of ſoda, and dried upon brown paper.

(813.) The boracic acid thus obtained, is in the form of thin hexagonal ſcales, of a ſilvery whiteneſs, reſembling, and having the greaſy feel of ſpermaceti. At firſt it has a ſouriſh taſte, which afterwards becomes bitter, and laſtly ſweet, with a ſenſation of coolneſs. It has no ſmell; but ſulphuric acid being poured upon it, cauſes it to emit the ſmell of muſk. It reddens vegetable blues. In the form of ſcales, its ſpecific gravity is 1·479; after it has been fuſed, it is 1·803.

(814.) It melts at a red heat into a hard tranſparent glaſs, which does not attract moiſture, though it becomes ſomewhat opaque when expoſed to the air. It is not affected by light.

(815.) Boiling water ſcarcely diſſolves 0·02 of boracic acid, and cold water ſtill leſs. When the ſolution is diſtilled part of the acid riſes with the water, and cryſtallizes in the receiver; though when dry, the moſt exceſſive heat does not raiſe it in vapour.

(816) As far as is at preſent known, this acid is not changed by oxygen gas, the ſimple combuſtibles or incombuſtibles, or by the metals.

(817.) It is ſoluble in alcohol, and this ſolution burns with a green flame. Paper dipped in its watery ſolution, alſo burns with a green flame.

(818.) At their vapourific temperature it combines with oils, and eſpecially mineral oils; forming fluid and ſolid compounds which convey a green colour to ſpirit of wine. When combined with phoſphorus, it does not deſtroy its inflammability; and a yellow earthy reſiduum is left after the combuſtion.

(819.) It is not known to oxidize or diſſolve any of the metals except iron and zinc, and perhaps copper. It combines with the alkalis, the alkaline earths, with alumina, and moſt of the metallic oxides, forming ſalts which are called *borates*.

(820.) Fabroni of Florence conſiders the boracic as a modification of the muriatic acid; and thinks it may be prepared from this acid, though he has not publiſhed the facts on which his opinion is grounded. Crell, by digeſting the boracic a very long time in oxymuriatic acid, ſucceeded in decompoſing it, and obtained from it a ſubſtance reſembling charcoal, and a volatile acid reſembling the muriatic acid; except that it did not precipitate lead from its ſolutions. He thinks this volatile acid to be very ſimilar to the *ſebacic*.

(821.) The boracic acid is not much uſed as a chemical agent; but it is much uſed as a flux in ſoldering, and in various metallurgic operations. It is alſo much uſed as a flux to bodies which are ſubjected to the blow-pipe

(822.) The order of the affinities of boracic acid is as follows:

Lime,
Barytes,
Strontites,
Magneſia,
Potaſh,
Soda,
Ammonia,
Glucina,
Alumina,
Zirconia,
Water,
Alcohol.

Sect. X. Phosphoric Acid.

(823.) In treating of phoſphorus it was obſerved, that this ſubſtance, like ſulphur, combines with two ſeveral doſes of oxygen. With the higheſt doſe it forms *phoſphoric*, and with the ſmaller doſe it forms *phoſphorous* acid.

(824.) Boyle was the firſt chemiſt who obſerved this acid; but its properties were firſt examined, and it was proved to be a peculiar acid, by Margraaf. It was afterwards more fully inveſtigated by Bergman, Scheele, Lavoiſier, Pearſon, Fourcroy and Vauquelin, and other eminent chemiſts.

(825.) It may be formed by burning phoſphorus in oxygen gas, where it depoſits in white flakes, which readily diſſolve in water. It may alſo be formed by conveying a ſtream of oxygen gas through phoſphorus melted under warm water, by means of a bent tube. The acid thus formed combines with the water, which may be evapourated by heat, and the acid obtained in a dry form. It is commonly prepared by throwing ſmall bits of phoſphorus into diluted nitric acid, which is moderately heated. A violent efferveſcence takes place, and nitrous gas is evolved. But if the acid be too ſtrong, or too much heated; or if too much phoſphorus be added at a time, it takes fire, and even explodes and breaks the veſſels. Perhaps the ſafeſt way is to drop nitric acid ſlowly into warm water which contains melted phoſphorus. After the phoſphorus is acidified, it is heated ſo as to expel any remains of nitric acid and water. During this proceſs it commonly emits a conſiderable portion of phoſphuretted hydrogen gas.

(826.) The acid thus prepared, after being heated to redneſs in a platinum crucible, ſo as to expel all the water, is ſolid, colourleſs, and tranſparent, and reſembles glaſs. It has a very ſour taſte; no ſmell; and reddens vegetable blues. When expoſed to the air it attracts moiſture, and deliqueſces into a viſcid liquor like oil. If this liquor be heated in a platinum crucible, the water evapourates, and leaves it in the ſtate of a tranſparent jelly. When the heat is increaſed it boils, owing to the ſeparation of the remainder of the water, in union with a ſmall portion of the acid. When heated to redneſs it becomes a tranſparent liquid, which on cooling conſolidates into a ſubſtance reſembling the pureſt cryſtal. In this ſolid ſtate it is called *phoſphoric glaſs*, which conſiſts of the phoſphoric acid deprived of water; and it again deliqueſces on expoſure to the air.

(827.) The ſpecific gravity of this acid when dry is 2·687; in the ſtate of glaſs, 2·8516; in the ſtate of deliqueſcence, 1·417.

(828.) When this acid is in the ſtate of white flakes, it diſſolves in water with a hiſſing noiſe, ſimilar to that cauſed by plunging a red hot iron in water. The glaſs diſſolves much more ſlowly. No ſuch heat is evolved by the ſolution of this acid in water, as by the dilution of the ſulphuric acid. Mr Sage by mixing equal parts of deliqueſced phoſphoric acid and diſtilled water, only raiſed the thermometer one degree. Lavoiſier by mixing equal parts of phoſphoric acid of the conſiſtence of ſyrup, and water, raiſed the thermometer from 50° to 63°; and when the acid was of the conſiſtence of turpentine, the thermometer roſe from 50° to 104°.

(829.) Neither oxygen, nor the ſimple combuſtibles except charcoal operate on phoſphoric acid. Charcoal has no effect upon it when cold; but at a red heat it abſorbs its oxygen, forming carbonic acid; while the phoſphorus riſes in vapour. This we deſcribed to be the method by which phoſphorus is prepared.

(830.) Liquid phoſphoric acid, when aſſiſted by heat, oxidizes ſeveral of the metals; and hydrogen gas is evolved, a proof that the oxidizement is owing to the decompoſition of water. The metals it oxidizes are iron, tin, lead, zinc, antimony, biſmuth, manganeſe; though on ſome it acts very ſlowly. When fuſed with iron, tin, and zinc, it is converted into phoſphorus, a proof that theſe metals have a ſtronger affinity for oxygen than phoſphorus. It does not act upon gold, platinum, ſilver, copper, mercury, arſenic, cobalt, nickel. In the dry way, when phoſphoric glaſs is fuſed with gold leaf, it acquires a purple colour, and thus ſeems to oxidize the gold.

(831.) The ſalts which this acid forms with alkalis, earths, and metallic oxides, are called *phoſphates*.

(832.) From the flakes formed by burning phoſphorus in oxygen gas, Lavoiſier deduced the component parts of phoſphoric acid to be,

60 oxygen,
40 phoſphorus.
——
100

But Dr Thomſon having formed 30 grains of phoſphorus into phoſphoric acid, by means of nitric acid, and precipitated by lime, deduced the component parts of phoſphoric acid to be,

62 oxygen,
38 phoſphorus.
——
100

Which does not differ much from Lavoiſier's reſult.

(833.) It is thought by ſome, that if this acid could be procured at a cheap rate, it might be employed with much advantage in various chemical manufactures, in medicine, and in various branches of domeſtic economy.

(834.) The following is the order of the affinities of phoſphoric acid.

Barytes,
Strontites,
Lime,
Potaſh,
Soda,
Ammonia,
Magneſia,
Glucina,
Alumina,
Zirconia,
Metallic oxides,
Silica.

Sect. XI. Phosphorous Acid.

(835.) It was ſtated that phoſphorus forms an acid product, with a ſmaller proportion of oxygen than enters into the compoſition of the phoſphoric acid; and that to this product the name of *phoſphorous acid* had been aſſigned. The difference between theſe acids had firſt been obſerved by Sage, Prouſt, and Morveau; but Lavoiſier in 1777 firſt aſcertained that they formed different compounds with other bodies; and that the difference of their qualities is owing to the different proportions of oxygen which enters into their compoſition.

(836.) Phoſphorous acid is formed by the ſlow combuſtion of phoſphorus in the ordinary temperature of the atmoſphere. Even during winter this proceſs goes on, and a portion of oxygen combines with phoſphorus when it is expoſed to the air. For this purpoſe bits of phoſphorus are placed upon the inclined ſides of a glaſs funnel, which being inſerted in a phial, the phoſphorous acid that is formed drops down into the phial. One ounce of phoſphorus yields about three ounces of this acid liquor.

(837.) This liquor is of a ſour taſte like phoſphoric acid. It reddens vegetable blues; is viſcid of different degrees of conſiſtence, and adheres like oil to the ſides of the glaſs veſſels in which it is contained. It emits a garlic ſmell, eſpecially when heated. It combines in every proportion with water; but cannot, like phoſphoric acid, be obtained in a dry form.

(838.) When heated it firſt parts with a portion of its water. Then large bubbles riſe to the ſurface, where they expand into a denſe white ſmoke, and take fire in the open air. Theſe bubbles conſiſt of phoſphureted hydrogen gas; and they prove that a portion of unoxygenated phoſphorus remains diſſolved in the phoſphorous acid, which at a high temperature, decompoſes water; part of the phoſphorus combining with the hydrogen gas and forming phoſphureted hydrogen.—Perhaps it may be found that phoſphorous acid is no other but the phoſphoric acid, containing a portion of phoſphorus in its compoſition.—After theſe bubbles have ceaſed to riſe, the acid which remains is no longer the *phoſphorous*, but the *phoſphoric* acid.

(839.) When this acid is much diluted with water, it is ſlowly converted into the phoſphoric acid by expoſure to air; or by paſſing oxygen gas through it, by means of a tube.

(840.) Charcoal decompoſes this acid as well as the phoſphoric, with a red heat, and the products are carbonic acid and phoſphorus. It acts on metals in the ſame way as the phoſphoric acid; only the hydrogen gas emitted during its oxidizement of metals, contains a portion of phoſphorus diſſolved in it.

(841.) Sulphuric acid, aided by heat, imparts to this acid a portion of its oxygen, and converts it into phoſphoric acid. If phoſphorous acid, obtained by ſlow combuſtion, be mixed with one eight of its weight of nitric acid of ſpecific gravity 1·3, and diſtilled, there remains in the retort very pure phoſphoric acid, formed by the transference of oxygen from the nitric to the phoſphorous acid. Fourcroy recommends this proceſs for obtaining phoſphoric acid in the utmoſt purity.

(842.) This acid has never been applied to any uſe; and though it is evidently compoſed of the ſame ingredients with the phoſphoric acid, the proportions of theſe in its compoſition have not been aſcertained.—Perhaps the proportion of oxygen in the compoſition of this acid may vary from the proportion which converts phoſphorus into an oxide, up to the complete ſaturation of phoſphorus with oxygen, which conſtitutes phoſphoric acid.

(843) The ſalts formed by combining phoſphorous acid with alkalis, earths, and metallic oxides, have obtained the name of *phoſphites*.

(844.) The order of the affinities of this acid follows:

Lime,
Barytes,
Strontites,
Potaſh,
Soda,
Ammonia,
Glucina,
Alumina,
Zirconia,
Metallic Oxides.

Sect XII. Carbonic Acid.

(845.) We formerly deſcribed this ſubſtance as a gas, or permanently elaſtic fluid, and pointed out its formation by the combuſtion of charcoal in contact with oxygen.—We now proceed to detail its acid properties.

(845.) As the diſcovery of the properties of this ſubſtance, chiefly by Dr Black, led to all the great improvements in modern chemiſtry, it may be proper to enter into the conſideration of carbonic acid with ſome degree of minuteneſs.

(846) This ſubſtance was not unknown to the ancients, who, on account of its deſtructive effects when reſpired, gave it the name of *ſpiritus Cethalis*. Paracelſus and Van Helmont knew that a peculiar kind of air was extricated from limeſtone and other bodies, which they called *ſpiritus ſylveſtris*, or *gas*. Hales, though he conſidered it only as contaminated air, aſcertained that it entered into the compoſition of various bodies, and became *fixed*. Dr Black proved it to be a peculiar ſubſtance, which entered into compoſition with lime,

magneſia, and alkalis, and deprived them of cauſticity. That when expelled from theſe baſes, they were reſtored to a ſtate of purity, and reſumed their cauſticity, or tendency to combine with other bodies. He therefore called this ſubſtance *fixed air*. This air or gas, was ſoon inveſtigated by Dr Prieſtley, and Mr Keir firſt diſcovered it to be an acid, a diſcovery which was confirmed by the experiments of Bergman, Fontana, and others. Bergman gave it the name of *aerial acid*; Mr Bewdly that of *mephitick acid*, from its deleterious effects when reſpired. Some called it *cretaceous acid*, and Mr Keir gave it the name of *calcareous acid*, becauſe it abounds in limeſtone. At laſt Lavoiſier having proved it to be a compound of carbon and oxygen, aſſigned it the name of *carbonic acid*, which it now retains.

(848.) As this acid abounds in nature, to obtain it, it is not neceſſary to burn charcoal in contact with oxygen. Take powdered chalk, or limeſtone, or marble, and having diluted them with water, pour on ſulphuric acid. A violent efferveſcence will enſue, owing to the diſengagement of carbonic acid in the gaſeous ſtate; which may be received in veſſels over water or mercury, in the uſual way.

(849.) This acid, in the ſtate of gas, is colourleſs and elaſtic like common air. It extinguiſhes combuſtion, and cannot be reſpired without almoſt inſtant death. It has no ſmell. It is conſiderably heavier than common air; its ſpecific gravity, according to Kirwan being 1·500, that of air being 1·000; or its weight is to that of air as 3 to 2. When the temperature is 60°, and barometer 30 inches, 100 cubic inches of this gas weigh 40·5 grains. From its weight this gas may be poured from one veſſel into another; and when poured from a wide mouthed bottle upon a candle placed on the floor, it deſcends and extinguiſhes it like water.

(850.) It has a ſharp pungent taſte, and reddens the tincture of turnſol but no other vegetable colour. The lower parts of the atmoſphere are ſuppoſed to contain about a hundredth part of this gas, but none of it has been detected in the higher regions. Unleſs it be toſſed and mixed with the air by ſtormy winds, it deſcends to the lower grounds, where it is abſorbed and decompoſed by plants; and this is one reaſon why low ſituations are leſs wholeſome for the reſpiration of animals, and more fertile in the production of plants, than thoſe which are higher ſituated

(851.) Carbonic acid is not altered by heat. or by paſſing through red hot tubes Dr Prieſtley obſerved that its bulk is enlarged by electric ſparks; and Monger diſcovered that inflammable gas is always evolved. Mr Sauſſure junior, by paſſing electric ſparks through it during 18 hours, increaſed its bulk 30 parts in 100, and decompoſed one tenth part of the carbonic acid into carbonic oxide. The oxygen ſeparated from the carbonic acid, had combined with, and oxidized the copper wires which tranſmitted the electric ſparks.

(852.) Water at a low temperature, abſorbs carbonic acid. At 41° water abſorbs its own bulk of this gas: The abſorption is haſtened by preſſure, and agitation; as is known to thoſe who prepare *aerated alkaline water* in the veſſel called Nooth's apparatus. At a low temperature, this water has little taſte; but at 88° it aſſumes an agreeable acidity and ſparkling appearance. By agitation and preſſure, alkaline water may be made to abſorb three times its bulk of carbonic acid. Ice does not abſorb this gas; and it is given out when the water freezes. It alſo eſcapes from water when left in an open veſſel, and atmoſpheric air combines with the water. When water impregnated with carbonic acid approaches the boiling temperature, the acid eſcapes in the gaſeous form. The *aerated alkaline water* contains a little ſoda, and is ſuper-ſaturated with carbonic acid, and is much uſed for giving relief in caſes of calculus, or the ſtone in the bladder.

(853.) Charcoal abſorbs about fourteen times its bulk of carbonic acid, and gives it out again unchanged. Phoſphorus does not diſſolve in carbonic acid, but is capable of decompoſing it, by the aſſiſtance of a ſufficient degree of heat. None of the other combuſtibles, nor oxygen, nor metals, produce any change upon it.

(854.) Carbonic acid combines with alkalis, with all the alkaline earths, and with ſeveral of the metallic oxides. It ſcarcely combines with alumina; and when combined with the alkaline earths to the point of ſaturation, the compounds are inſoluble in water. The ſalts formed by the union of this acid with bodies, are called *carbonates*.

(855.) The inſolubility of the compounds of this acid with the alkaline earths, enables us to detect the preſence of theſe earths in liquids. If a ſtream of carbonic acid gas be paſſed through lime water, for example, or blown through it by a pipe from the lungs, the water will become inſtantly milky; and after the lime is ſaturated with carbonic acid, it will fall to the bottom in the form of a white cloud. In the ſame manner if lime-water be introduced into a mixture of the carbonic and other gaſes, the lime will abſorb the carbonic acid gas; and by the riſe of the liquid in the jar, we can know the proportion it bears to the whole mixture.

(856.) From the experiments of Mr Tennant, compared with thoſe of Lavoiſier, it appears that carbonic acid is compoſed of

28 carbon,
72 oxygen.
——
100

(857.) To the ſyntheſis explained when treating of this acid as a gas, Mr Tennant has now confirmed the compoſition of this acid by analyſis, and has ſucceeded in decompoſing it. Into a glaſs tube he put a bit of phoſphorus, and ſome carbonate of lime; and having ſealed it hermetically, he expoſed it to heat. The phoſphorus was found to be changed into phoſphoric acid, by abſorbing oxygen from the carbonic acid; and combining with the lime, formed phoſphate of lime. At the ſame time the charcoal, which entered into the compoſition of the carbonic acid, was depoſited in an uncombined ſtate. Dr Pearſon, who repeated this experiment, aſcertained that the weight of the oxygen abſorbed by the phoſphorus, added to that of the charcoal depoſited,

ſited, were equal to the weight of the carbonic acid decompoſed. When he introduced pure lime and phoſphorus into the tube, they combined, forming phoſphuret of lime, without any depoſition of charcoal; a proof that the latter had been derived from the decompoſition of the carbonic acid in the carbonate of lime.

(858.) Carbonic acid gas is let looſe in great quantities in conſequence of chemical proceſſes which are going on in the bowels of the earth. Being heavier than common air, it always occupies the lower parts of wells and pits, and is called by miners *choak-damp*. Hence men are often inſtantly killed when they incautiouſly deſcend into theſe places. To avoid ſuch accidents, they ſhould let down a lighted candle, or ſtraw, or bruſh-wood, which will go inſtantly out when they deſcend into the carbonic acid gas; and they ſhould not go down until the pit be ſo completely purified that a candle will burn clear at its bottom. The Grotto del cano in Italy, conſtantly emits this gas, and it kills dogs and low animals; while men, who reſpire the upper ſtratum of air, are not affected by it.

(859.) We have ſeen that carbonic acid gas is formed by the combination of charcoal with oxygen during combuſtion; and where fires are kept in cloſe confined bed-rooms, people are often ſuffocated from this cauſe. It is alſo emitted, in great quantities, during the vinous fermentation of liquors, and people are often killed by raſhly going down into vats filled with this gas.

(860.) In theſe caſes, when life is not totally extinguiſhed, the beſt method of recovery is ſaid to be, to daſh cold water on the head and body; while the lungs are evacuated of their deleterious contents and freſh air introduced in their place.

(861.) The order of the affinities of carbonic acid, is as follows:

Barytes,
Strontites,
Lime,
Potaſh,
Soda,
Magneſia,
Ammonia,
Glucina,
Zirconia,
Metallic Oxides,

METALLIC ACIDS.

(862.) It was formerly ſtated that metals combine with certain proportions of oxygen, which deſtroys their luſtre and malleability, and reduces them to earth-like ſubſtances called *oxides*. But ſome metals are capable of combining with larger doſes of oxygen than is neceſſary to convert them into oxides, and with theſe larger proportions of oxygen they exhibit all the properties of acids.

SECT. XIII. ARSENIC ACID.

(863.) Arſenic is capable of combining with two doſes of oxygen. With the firſt, or loweſt doſe, it conſtitutes what is commonly called *arſenic*, or *white oxide of arſenic*. This is found native, and as it poſſeſſes acid properties, it was diſtinguiſhed by Fourcroy by the name of *arſenious acid*. It has a ſharp acrid taſte, which leaves an impreſſion of ſweetneſs, and is a violent corroſive poiſon. When heated it ſmells like garlic; is ſoluble in 80 parts of water at the temperature of 60°, and in 15 parts of boiling water. Its ſolution reddens vegetable blues, and has an acrid taſte. Its ſpecific gravity is 3·706. It combines with moſt of the metals, by fuſion, and renders moſt of them brittle. From the experiments of Prouſt arſenious acid appears to contain

75·2 arſenic,
24·8 oxygen.
———
100·0

(864.) The *arſenic acid*, which contains the higheſt doſe of oxygen combined with this metal, was firſt diſcovered by Scheele in 1775; and has ſince been more fully inveſtigated by Pelletier, Prouſt, and Bucholz.

(865.) Scheele prepared this acid by diſſolving three parts of the white oxide of arſenic, or the arſenious acid juſt deſcribed, in ſeven parts of muriatic acid. To this ſolution was added five parts of nitric acid, and the whole diſtilled to dryneſs. What remains is arſenic acid in a ſolid form. Bucholz mixed in a retort one part of muriatic acid of the ſpecific gravity 1·2 with four parts of the white oxide of arſenic, and twelve parts of nitric acid of the ſpecific gravity 1·25. This mixture was boiled until the oxide diſappeared, and nitrous gas ceaſed to be emitted. Being then evapourated to dryneſs, and expoſed for a few minutes to a low red heat, there remained in the retort arſenic acid in a ſolid form. It is evident that this acid is formed by the decompoſition of the nitric acid, which imparts its oxygen to the arſenical baſe.

(866.) Arſenic acid is a white ſolid maſs, its ſpecific gravity is 3·391. It is very fixed, and by a ſtrong heat is converted into glaſs, which corrodes the veſſel in which it is melted. When expoſed to a ſtrong heat, ſome oxygen eſcapes, and a part is converted into white oxide, or arſenious acid.

(867.) The glaſſy arſenic acid attracts moiſture from the air, and diſſolves ſlowly in ſix parts of cold water. In two parts of boiling water it diſſolves rapidly, and continues in ſolution after a great part of the water is evapourated. By evapourating the water it firſt acquires the conſiſtence of ſyrup, and then depoſits cryſtals in grains. When liquid its taſte is acid, cauſtic and metallic; and it reddens the ſyrup of violets. It is poiſonous like the former.

It is not altered by oxygen, or expoſure to the air. The ſimple combuſtibles decompoſe it, by the aſſiſtance of heat. Hydrogen gas, paſſed through the liquid acid, precipitates it in the form of white oxide. Charcoal, ſulphur, and phoſphorus produce a ſimilar effect. When heated with charcoal combuſtion takes place, and the arſenic acid is reduced to its metallic ſtate. Sulphur heated in contact with arſenic acid, is partly converted into ſulphurous acid gas, and partly ſublimed in the red ſulphuret of arſenic. When heated with phoſphorus, part of the phoſphorus is converted into phoſphoric acid, and part ſublimes with the arſenic reduced to its metallic ſtate, forming phoſphuret of arſenic. The inflammation which takes place in theſe caſes, is evidently owing to the oxygen of the acid combining with the inflammable body; and hence arſenic acid is a ſupporter of combuſtion.

(868.) Arſenic acid is decompoſed by ſeveral of the metals when aſſiſted by heat. It does not act at all on gold, platinum; nor on ſilver and mercury, except aſſiſted by a ſtrong heat, when it oxidizes the latter. It oxidizes copper, iron, lead, tin, zinc, biſmuth, antimony, cobalt, nickel, manganeſe, and arſenic.

(869.) The ſalts which it forms by combining with alkalis, earths, and metallic oxides, are called *arſeniates*.

(870.) The conſtituents of this acid, according to Prouſt, are

65 arſenic,
35 oxygen.
———
100

(871.) The following is the order of its affinities:

Lime,
Barytes,
Strontites,
Magneſia,
Potaſh,
Soda,
Ammonia,
Glucina,
Alumina,
Zirconia,
Metallic Oxides.

SECT. XIV. TUNGSTIC ACID.

(872.) This was diſcovered by Scheele in 1781. But Vauquelin and Hecht have ſhewn that it owed its acid properties to the acids employed in its extraction; and that the white powder which was miſtaken for an acid, is in reality an oxide of tungſten. It is taſteleſs, inſoluble in water, and does not alter vegetable blues. It combines indeed with the alkalis, and ſome earths, forming compounds which have obtained the name of *tungſtates*, but this property is common to ſome other oxides. This ſubſtance is therefore now eraſed from the liſt of acids, and claſſed among the oxides.

SECT. XV. MOLYBDIC ACID.

(873.) This acid is compounded of the metallic ſubſtance molybdenum, and oxygen, and was diſcovered by Scheele in 1778. It was afterwards more fully inveſtigated by Mr Hatchett, and Bucholz.

(874.) Scheele prepared this acid from the native ſulphuret of molybdenum, by the following proceſs. The mineral being reduced to fine powder, had nitric acid, or rather a mixture of nitric and muriatic acids, diſtilled off it, until the whole was converted into a white maſs. The maſs was now waſhed with water, to carry off the ſulphuric acid formed, and the remains of the other acids uſed; after which what remained was molybdic acid in a tolerable ſtate of purity.

(875.) Bucholz has lately pointed out another proceſs. The mineral being reduced to fine powder as before, is expoſed to a ſtrong red heat in an open crucible, and ſtirred with an iron rod until the whole aſſumes an aſh-grey colour. The heat muſt be gradually lowered, to prevent the coherence of the particles. This roaſting expels the ſulphur from the metal, and at the ſame time acidifies it conſiderably by cauſing it to combine with atmoſpheric oxygen. The maſs being reduced to powder, is digeſted in a ſolution of ſoda, or ammonia, which takes up the acid by its union with the alkali. Being allowed to depoſit its ſediment in a corked bottle, the clear liquor is decanted off, and muriatic acid poured into it, which combining with the alkali, precipitates the molybdic acid in the form of a fine white powder. This powder being waſhed as before, is the molybdic acid in a ſtate of purity. We have ſeen this acid in the form of hoar-froſt, on the ſurface of mineral molybdenum, which had been expoſed to the fumes of the nitric and muriatic acids.

(876.) Molybdic acid, thus prepared, is a white powder, whoſe ſpecific gravity is 3·460. It is not ſoluble in cold water, and is only ſoluble in 960 parts of boiling water. The ſolution is pale yellow, has no taſte; but reddens litmus paper. It is precipitated from this ſolution by ſulphuric, nitric, and muriatic acids. Paper dipped in this acid, and expoſed to the ſun's rays, aſſumes a beautiful blue colour.

(877.) When heated in cloſe veſſels, it ſublimes and cryſtallizes; but in open veſſels it riſes in white ſmoke, which condenſes on cold bodies in the form of brilliant yellow ſcales.

(878.) Sulphur, and charcoal, and ſeveral of the metals, decompoſe molybdic acid. When fuſed with protoxide of molybdenum, the mixture forms a blue oxide.

(879.) Sulphuric acid diſſolves the molybdic when aſſiſted by heat, and the hot ſolution is colourleſs; but becomes blue when cold. The blue colour becomes much more intenſe when the ſolution is ſaturated with ſoda. A ſtrong heat expels the ſulphuric acid from this ſolution, and the molybdic acid remains behind. The muriatic acid alſo diſſolves the molybdic, forming a pale yellowiſh green ſolution, which, when ſaturated with potaſh, becomes blue.

(880.) With potaſh this acid forms a ſoluble colourleſs ſalt. It alſo combines with the other alkalis, ſome of the earths, and ſeveral metallic oxides; forming ſalts which are diſtinguiſhed by the name of *molybdates*.

(881.) This acid has never been applied to any uſe, and its conſtituent parts, according to Bucholz, are

67 Molybdenum,
33 Oxygen.
———
100

SECT. XVI. CHROMIC ACID.

(882.) This acid was lately diſcovered by Vauquelin, and has only yet been found in the red lead ore of Siberia, and in chromate of iron.

(883.) It is obtained by boiling the red lead ore of Siberia in carbonate of ſoda, or potaſh. The chromic acid combines and becomes ſoluble with the alkali. The ſolution being decanted off, and muriatic or any mineral acid being added, the chromic acid is thrown out of union with the alkali, and precipitated in the form of a red powder.

(884.) The chromic acid, thus obtained, is a red or orange yellow powder, ſoluble in water, and of a ſtrong acrid and metallic taſte. It cryſtallizes from watery ſolution in the form of elongated priſms, of a ruby colour.

(885.) When heated, it emits oxygen gas, and is converted into the green oxide of chromium. Mixed with filings of tin, and muriatic acid, it firſt aſſumes a yellowiſh brown, and afterwards a beautiful green colour. Paper dipped in this acid, and expoſed to light, aſſumes a green colour.

(886.) A mixture of the chromic and muriatic acids diſſolves gold like aqua regia; and when the mixture is diſtilled, oxymuriatic acid is diſengaged, and the liquor aſſumes a very beautiful green colour.

(887.) When heated along with charcoal, the chromic acid gives out its oxygen, and is reduced to the metal called *chromium*.

(888.) The proportion of oxygen in the compoſition of this acid, has not been aſcertained. It combines with the alkalis, to which it conveys an orange colour when its ſalts are cryſtallized, and hence the acid derives its name. The ſalts it forms with other bodies are called *chromates*.

(889.) From the variety of beautiful colours which this acid imparts to other bodies, it promiſes to be uſeful in painting on porcelain and glaſs, and alſo in dyeing.

Sect. XVII. Columbic Acid.

(890.) This acid was diſcovered by Mr Hatchett, in 1801, in union with oxide of iron. Having fuſed the iron with five or ſix times its weight of potaſh, part of the acid combined with the alkali, and was ſeparated from the maſs by water. Muriatic acid was added to diſſolve that part of the oxide of iron which had been deprived of its columbic acid, and the remainder being again fuſed with potaſh, yielded an additional portion of acid. By repeating the proceſs, the whole acid was combined, and formed a limpid ſolution with potaſh To this nitric acid being added, the columbic acid was precipitated in the form of white flakes.

(891.) The columbic acid is of a pure white colour, and is not very heavy. It has ſcarcely any taſte; is inſoluble in water, but when placed upon litmus paper moiſtened with diſtilled water, it ſoon changes its colour to red. It is not melted by a ſtrong heat, but loſes its luſtre.

(892.) With ſulphuric acid it forms a limpid ſolution, which the addition of water renders milky. A white precipitate falls which changes to lavender blue, and when dry becomes browniſh grey. This precipitate is a compound of the ſulphuric and the columbic acids, which is ſemitranſparent, and breaks with a vitreous fracture.

(893.) The nitric acid does not diſſolve the columbic; but the muriatic acid diſſolves it when aſſiſted by heat. Water does not cauſe a precipitation from this ſolution; but when evaporated to dryneſs, the reſiduum is a pale yellow ſubſtance ſcarcely ſoluble in muriatic acid.

(894.) The columbic expels the carbonic acid from potaſh and ſoda, and combines readily with theſe alkalis. With potaſh this acid forms a glittering ſcaly ſalt like boracic acid, which contains a ſmall exceſs of alkali, and has an acrid diſagreeable flavour. Nitric acid expells the columbic from its union with theſe alkalis, owing to its ſuperior affinity for them.

(895.) The other properties of this acid are not yet known.

Combustible Acids.

(896.) This claſs of acids was formerly diſtinguiſhed by the name of *animal* and *vegetable* acids, becauſe the greateſt part of them was found in the animal and vegetable kingdoms. They differ from the acids we have deſcribed in ſeveral reſpects.

(897.) When combined with potaſh, and expoſed to heat, carbureted hydrogen gas is emitted, and charcoal is evolved. But no inflammable ſubſtance is depoſited by expoſing the other acids to heat alone.

(898.) The other acids contain only one baſis, whereas theſe contain two, namely *carbon* and *hydrogen*; and ſome of them alſo contain *azote*. Though oxygen uſually enters into their compoſition, this is not always the caſe; and therefore to ſuch the theory of Lavoiſier concerning the acidifying principle does not apply.

Sect. XVIII. Acetic Acid.

(899.) This acid, unleſs we except thoſe which are ready formed in vegetables, appears to have been the firſt that was known to mankind. It is mentioned by Moſes, and ſeems to have been in very general uſe from the earlieſt times. When firſt prepared it is called *vinegar*; when rectified by diſtillation it is called *diſtilled vinegar*, or *acetous acid* by chemiſts; when highly concentrated it is called *radical vinegar*, and by chemiſts *acetic acid*.

(900.) Vinegar is prepared from beer, or wine, which become ſour when expoſed to the air at a temperature between 70° and 80°, and eſpecially if ſome fermenting ſubſtance be added to the liquor. The proceſs by which it is formed is called the *acetous fermentation*, which we may have an opportunity of conſidering more fully afterwards.

(901.) Boerhave deſcribes a proceſs for making vinegar from wine, which is ſtill followed in many of the wine countries. Two large oaken vats or hogſheads, open at one end, have each a wooden grate or hurdle fixed about a foot above their bottom. On each of theſe grates is placed a layer of the green twigs of the vine. The veſſels may then be filled with the footſtalks of grapes, called *rape*, in order to increaſe the ſtrength of the fermentable matter.—The veſſels being thus prepared, one of them muſt be filled to the top with the wine to be fermented into vinegar, and the other muſt only be half filled. A fermentation, with increaſe of heat, ſoon takes place in the half filled veſſel, and at the end of every twenty four hours this muſt be filled up with liquor from the full veſſel. The fermentation only goes on in the half filled veſſel, and by exchanging the liquor every twenty four hours, the fermentation is checked and goes on in each veſſel alternately. In about 12 or 15 days the vinegar is formed; though during winter longer time is neceſſary.

(902.) Vinegar has generally the colour of the liquor from which it was fermented, a ſour taſte, and an agreeable ſmell. Its ſpecific gravity varies from 1·8135 to 1·0251. It is liable to ſpontaneous decompoſition; but Scheele diſcovered that by making it boil for a few ſeconds, and corking it in bottles, it may be made to keep a very long time. Vinegar contains one or more vegetable acids beſides the acetic; and likewiſe mucilage, tartar, and colouring matter.

(903.) When diſtilled by the heat of a water-bath until about two thirds have paſſed over, the impurities are left behind. The liquor which paſſes over is limpid as water, of an agreeable odour, and a ſtrong acid taſte. This is *diſtilled vinegar*, or the *acetous acid* of the chemiſts, and it conſiſts of the acetic acid combined with a portion of water. It will keep any length of time in cloſe veſſels. Expoſed to a moderate heat, it wholly evapourates without change. Expoſed to cold, moſt of the aqueous congeals, and what remains liquid is the acid in a high ſtate of concentration. Mr Lowitz has proved that the acid itſelf, however much it may be concentrated, congeals at 22° below 0.

(904.) When acetate of copper is reduced to powder and diſtilled, at firſt there comes over a liquor nearly taſteleſs and colourleſs, and afterwards a highly concentrated acid. When the heat is continued until the bottom of the retort is red hot, no more acid comes over, and there remains a powder of the colour of copper. The acid product, which ſhould be collected in a receiver by itſelf, is tinged green by a little copper which comes over with it; but by diſtilling again with a gentle heat, it is obtained tranſparent and colourleſs like water. This acid is very pungent and concentrated; and is the *radical vinegar*, or the *vinegar of Venus* of the alchymiſts.

(905.) It was firſt ſuppoſed by Berthollet and others that the acid, in this caſe, combined with a new portion of oxygen obtained from the oxide of copper from which it was diſtilled. Hence the name of *acetic* acid, which marked the higheſt doſe of oxygen which could combine with any baſis. But Adet, Darracq, Prouſt, and others, have demonſtrated that radical vinegar differs in no reſpect from *acetous acid* except in being much more concentrated, and in being more completely freed of the impurities which in ſome degree contaminate the former, as well as common vinegar. The opinion then of the baſis of vinegar combining with different doſes of oxygen, ſo as to conſtitute acids with different properties, is now given up.

(906.) Lowitz of Peterſburgh has pointed out another method of obtaining acetic acid in a high ſtate of concentration.—To three parts of acetate of potaſh add four parts of ſulphuric acid, and diſtill off the acetic acid. The ſulphuric acid combines with the potaſh, and ſets looſe the acetic; but a portion of the former comes over with the latter. This may be ſeparated by diſtilling the product again from acetate of barytes.

(907.) The ſpecific gravity of *diſtilled vinegar* varies from 1·007 to 1·0095; but that of *radical vinegar* is as high as 1·080. The radical vinegar is very pungent and acrid; it ſoon corrodes the ſkin, and changes vegetable blues to red. It is very volatile, and readily takes fire. It combines with water in any proportion, and during mixture much heat is evolved.

(908.) This acid cryſtallizes when prepared in the way laſt deſcribed. It may alſo be made to cryſtallize when made into a paſte with charcoal, and diſtilled with the heat of a water-bath, or 212°, which expels the water combined with it. The heat being afterwards raiſed, the acid comes over, and cryſtallizes in the receiver, provided it be changed.

(909.) This acid oxidizes iron, zinc, copper, nickel, tin; and is not known to act upon the other metals. It combines with alkalis, earths, and metallic oxides, and the ſalts it forms with theſe ſubſtances are known by the name of *acetates*.

(910.) It is decompoſed by ſulphuric and nitric acids; it diſſolves the boracic, and abſorbs carbonic acid. It combines a variety of vegetable ſubſtances, ſuch as oils, mucilage, and aromatics.

(911.) Prouſt and Lavoiſier have rendered it probable that azote enters into the compoſition of this acid, though its proportion has not been aſcertained. From an experiment of Dr Higgins, in diſtilling acetate of potaſh, it ſeems to follow that 100 parts of acetic acid is compoſed of

50·19	oxygen
13·94	hydrogen
35·87	carbon
100·00	

(912.) The order of the affinities of this acid is as follows:

Barytes,
Potaſh,
Soda,
Strontites,
Lime,
Ammonia,
Magneſia,
Metallic oxides,
Glucina,
Alumina,
Zirconia.

Sect. XIX. Oxalic Acid.

(913.) The oxalic acid exiſts ready formed in the *oxalis acetoſella*, or wood ſorrel, and other plants of that genus, as was diſcovered by Scheele, to whom we are indebted for the diſcovery of this acid. It has alſo been called the *ſaccharine acid*, or *acid of ſugar*, becauſe it is commonly prepared from this ſubſtance.

(914.) The proceſs commonly employed for its preparation, is that which was recommended by Bergman. An ounce of white ſugar powdered, is put into a tubulated retort, with three ounces of nitric acid, of the ſpecific gravity 1·567. The ſugar diſſolves, and fumes of nitrous acid eſcape. Then a receiver is fitted, and the liquor made to boil, which cauſes much nitrous gas to riſe. When the liquor in the retort acquires a reddiſh-brown colour three ounces more of the nitric acid are added, and the boiling is continued until the liquor becomes colourleſs. The contents of the retort being now emptied into a broad veſſel, the oxalic acid, formed during the boiling, ſhoots into quadrilateral priſms which are often affixed to each other at an angle of 45°. Theſe cryſtals being collected and dried upon blotting paper, may be farther purified by ſolution in diſtilled water, evapourating, and cryſtallizing them a ſecond time. If two ounces of nitric acid be added to the liquid reſiduum, boiled and cryſtallized as before, an additional quantity of the oxalic acid may be obtained.

(915.) By the ſame proceſs, oxalic acid may be obtained from gum arabic, alcohol, honey, wool, hair, and a variety of animal and vegetable ſubſtances. We have obtained it from powdered peat, when treated in this manner.

(916.) Oxalic acid, thus prepared, is in the form of four ſided priſms, terminated by two ſided ſummits. They are tranſparent, and of a brilliant white colour; have a very acid taſte, and redden all vegetable blues, except indigo.

(917.) Theſe cryſtals diſſolve in water with a crackling noiſe. Boiling water diſſolves its own weight, and water 65° half its weight of them. Boiling alcohol diſſolves 56 parts in 100 of its weight of theſe cryſtals, and at medium temperature, only 40 parts. Liquid oxalic acid has a very acrid taſte when concentrated, but when much diluted it is a very agreeable acid. According to Morveau, one part of cryſtallized acid, conveys a ſenſible acidity to 2633 parts of water. Water may be evapourated from it, without carrying any of the acid along with it.

(918.) This acid oxidizes lead, copper, iron, tin, biſmuth, nickel, cobalt, zinc, mangane ſe; but does not act upon gold, platinum, ſilver, or mercury. It combines with alkalis, earths, and metallic oxides; and the ſalts it forms are called *oxalates*.

(919.) When the cryſtals of oxalic acid are expoſed to heat, a white ſmoke ariſes, which is very diſagreeable to the eyes and noſtrils. The reſiduum is whiter than the acid had been, and $\frac{1}{10}$ths of its weight is loſt, which is recovered by expoſure to the air. When diſtilled with a ſtrong heat, it yields a great quantity of carbonic acid gas, and of carbureted hydrogen gas, while charcoal remains behind.

(920.) Muriatic and the acetic acids diſſolve the oxalic, but without altering it. The ſulphuric acid, when aſſiſted by heat, partly decompoſes it, and charcoal is formed. At a boiling heat, nitric acid decompoſes, and converts it into carbonic acid and water.—Hence, in the formation of this acid, the nitric acid ſhould not be added in exceſs.—From an obſervation of theſe premiſes, Fourcroy and Vauquelin have inferred the oxalic acid to be compoſed of

77 oxygen
13 carbon
10 hydrogen
——
100

(921.) As this acid forms an inſoluble compound with lime, it has been recommended by ſome as a preventative of the gravel, and other diſeaſes which are ſuppoſed to ariſe from a tendency in the bones to diſſolve, and to be carried off by the urinary ducts. It is ſuppoſed that eating ſorrel, and other plants which contain it, may anſwer this purpoſe. It might form a very agreeable acid for domeſtic uſes, were it not too expenſive.

(922.) Its property of forming an inſoluble compound with lime, renders it very uſeful for detecting the preſence of lime in ſolutions. It takes lime from all the other acids; and if a little of it be dropped into the ſolution of any ſalt of lime, a white cloud is formed, which ſoon falls to the bottom. In this way lime may be precipitated from its union with any of the other acids.

(923.) The following is the order of the affinities of the oxalic acid.

Lime,
Barytes,
Strontites,
Magneſia,
Potaſh,
Soda,
Ammonia,
Alumina.

SECT. XX. TARTARIC ACID.

(924.) TARTAR, or Cream of Tartar, a ſubſtance which is evolved during the fermentation of wine, has long been the object of chemical inveſtigation. It was long ago diſcovered to be an acid united to potaſh; but Scheele was the firſt who obtained it in an uncombined ſtate.

(925.) To obtain the tartaric acid, the ſubſtance called *tartar*, or *cream of tartar*, is boiled in water, and powdered chalk added until efferveſcence ceaſes, and the liquor no longer reddens vegetable blues. Being allowed to cool, the liquor is thrown upon a filter, and well waſhed. A white powder is left upon the filter, which is tartaric acid combined with lime. This powder being put into a matraſs, and diluted with water, has as much ſulphuric acid added to it as is equal to the weight of the chalk employed. Allow it to digeſt 12 hours in a moderate heat, and ſtir it occaſionally. The ſulphuric acid combines with the lime; and falls to the bottom; while the tartaric acid remains diſſolved in the water. The ſulphat of lime being allowed to ſubſide, the clear liquor is decanted off, and a little acetate of lead dropped in, which forms a white cloud if any ſulphuric acid ſhould remain. Should this be the caſe, the liquor muſt be digeſted with more tartrate of lime, until all the ſulphuric acid be abſorbed. If not, the liquid being ſlowly evapourated, depoſits about one third of the weight of the tartar employed, of tartaric acid in a cryſtallized form. Theſe cryſtals may be purified by diſſolving them again in diſtilled water, and cryſtallizing them a ſecond time by ſlow evapouration. Fourcroy thinks this acid exiſts, in a ſtate of purity, in ſome vegetables; and Vauquelin found a 64th part in the pulp of the tamarind.

(926.) The cryſtals of tartaric acid are exceedingly various in their figure, ſize, and mode of arrangement. They have a ſharp acid taſte, and diluted with water, the taſte reſembles that of lemon juice. The acid ſtrongly reddens vegetable blue colours. The cryſtals do not decompoſe when expoſed to the air. They are very ſoluble in water, and a concentrated ſolution does not loſe its acid properties in the air; though one that is much diluted is apt to do ſo. The ſpecific gravity of the cryſtals is 1·5962.

(927.) When expoſed to heat in an open fire, the cryſtals burn, leaving a ſpongy reſiduum of charcoal, in which a little lime has been detected. When diſtilled in cloſe veſſels, this acid is converted into carbonic acid gas, and carbureted hydrogen gas, a coloured oil, and a reddiſh acid liquor; which was formerly diſtinguiſhed by the name of pyrotartarous acid. Fourcroy and Vauquelin have lately aſcertained this liquor to be acetic acid impregnated with oil.

(928.) Hermbſtad aſcertained that the tartaric acid, after being repeatedly diſtilled with ſix times its weight of nitric acid, is converted into the oxalic acid. From 360 parts of tartaric acid, he obtained, by this proceſs, 560 parts of oxalic acid.

(929.) This acid has never been applied to any uſe, but ſome of its compounds are much uſed in medicine. It combines in two different proportions with a great variety of baſes. Thus, with potaſh, the loweſt proportion forms a ſalt which is pretty ſoluble in water, called *tartarate of potaſh*. But its higheſt proportion with potaſh, forms *tartar*, a ſalt which is ſcarcely ſoluble in water. In order then to detect the preſence of this acid in any liquor, it is only neceſſary to drop in a little of the ſolution of potaſh, which combining with the acid, will form a cloud, or inſoluble ſalt.

(930.) This acid oxidizes iron, zinc, and mercury; but is not known to act upon the other metals. It combines with alkalis, earths, and metallic oxides, forming ſalts which are known by the name of *tartrates*.

(931.) According to Fourcroy and Vauquelin, the conſtituents of this acid are

70·5	oxygen
19·0	carbon
10·5	hydrogen
100·0	

(932.) The following is the order of the affinities of this acid.

Lime,
Barytes,
Strontites,
Magneſia,
Potaſh,
Soda,
Ammonia,
Metallic oxides,
Alumina.

Sect. XXI. Citric Acid.

(933.) It has long been known that the juice of oranges and lemons is an acid; but it is not pure, as it contains mucilage, which renders it liable to ſpontaneous decompoſition.

(934.) Mr Georgius in 1774, publiſhed in the Swediſh Memoirs, a proceſs for obtaining the acid pure. He filled bottles with lemon juice, and having corked them cloſe, ſet them in a cellar. In four years the mucilage had dropped to the bottom in flakes, a thick cruſt had formed at the cork, and the liquid was become limpid as water. Having decanted off this liquid he expoſed it to a cold of 23°, which froze great part of the water, and left behind a pretty ſtrong acid. The acid was not however perfectly pure, and it was Scheele who firſt pointed out the method of obtaining this acid in purity, and demonſtrated its peculiar properties.

(935.) Having filtered lemon juice, add powdered chalk to it in ſmall quantities, as long as effervеſcence takes place, or until the acid be ſaturated. The lime forms an inſoluble compound with the citric acid, and falls to the bottom in the form of a white powder. This powder being thrown upon a filter, and waſhed with warm water until it comes off clear, muſt be put into a matraſs with ſix times its weight of water. Then add as much ſulphuric acid as may be ſufficient to ſaturate the lime and boil it for ſome minutes. The ſulphuric acid now forms an inſoluble compound with the lime, while the citric acid remains diſſolved in the water. Having thrown the ſulphate of lime upon a filter, and waſhed off the citric acid with water, this acid is obtained in a liquid form. The liquid being now evapourated to the conſiſtence of ſyrup, and ſet aſide to cool, the *citric acid* is obtained in a cryſtallized form.

(936.) Mr Scheele adviſes to add ſulphuric acid in exceſs, to enſure the ſeparation of the lime; and Dizé thinks this neceſſary to diſſolve the mucilage which adheres to the citric acid. But Prouſt has proved that when too great an exceſs of the ſulphuric acid, is uſed, it acts upon the citric acid itſelf, converts part of it into charcoal, and prevents it from cryſtallizing. This miſtake is corrected by adding a little chalk. This chemiſt aſcertained that 94 parts of lemon juice were neceſſary to ſaturate 4 parts of chalk; and 7½ parts of citrate of lime were obtained; to decompoſe which required 20 parts of ſulphuric acid, of the ſpecific gravity 1·15.

(937.) The cryſtals of citric acid are rhomboidal priſms, the ſides of which are inclined to each other at angles of 60 and 120 degrees, terminating at each end in four trapezoidal faces which include the ſolid angles. Their taſte is exceedingly acid, and even painful; but when ſufficiently diluted with water, the acid is cooling and pleaſant. The acid has a ſlight odour of lemons, and reddens vegetable blues.

(938.) When thrown in the fire, the cryſtals melt, exhale an acrid vapour, and leave behind a ſmall quantity of charcoal. Diſtilled in cloſe veſſels, part evapourates without decompoſition, and the remainder is converted into acetic acid, carbonic acid, and carbureted hydrogen gas, which comes over; and charcoal is left in the retort.

(939.) This acid is very ſoluble in water. According to Vauquelin 75 parts of cold water diſſolves 100 parts of its cryſtals; and boiling water diſſolves twice its weight of them. The cryſtals are not altered by expoſure to the air; and a ſtrong ſolution may be kept a long time in cloſe veſſels, though it putrifies and is decompoſed at laſt.

(940.) Concentrated ſulphuric acid converts

:ric into acetic acid. 'Scheele could not
t it into oxalic acid by treating it with the
.cid; but Weſtrumb effected this converſion.
iting 60 grains of citric acid with 200 grains
'ic acid, he got 30 grains of oxalic acid.
300 grains of nitric acid he obtained only 15
of oxalic acid; and with 600 grains of ni-
id, no oxalic acid was obtained. On diſ-
theſe products particularly the laſt, it was
to conſiſt of vinegar mixed with nitric acid.
refore infers that Scheele had uſed too great
ortion of nitric acid, by which the citric a-
l been converted into the acetic inſtead of
ilic acid.—The action of the other acids on
ric has not been examined.

.) From theſe experiments it appears that
.cid is compoſed of oxygen, hydrogen, and
; though their proportions have not been
ined.

.) This acid ozidizes iron, zinc, tin; but
known to act upon the other metals. The
forms with alkalis, earths, and metallic
are called *citrates*.

.) The uſes of this acid in making *lemonade*,
and other drinks, and as a ſeaſoner for
ire well known. The cryſtals of the acid
tely been introduced in place of the expreſ-
:e of lemons, as much of the acid can thus
veyed under a ſmall bulk. But they have
peculiar flavour of the natural juice, which
wing to their wanting the aromatic oils of
its.

.) The following is the order of the affini-
this acid.

Lime,
Barytes,
Strontites,
Magneſia,
Potaſh,
Soda,
Ammonia,
Alumina,
Zirconia.

SECT. XXII. MALIC ACID.

.) THIS acid, as its name imports, abounds
es, and is found in various fruits and plants
ormed. Its properties were firſt diſcover-
Scheele, who propoſed the following pro-
extracting it.

) Having bruiſed ſour apples, ſqueeze out
ce, and filter it through a linen cloth.
e this juice with potaſh, and add to it ace-
lead until no more precipitation enſues.
:etic acid combines with the potaſh, and
with it diſſolved in the liquor; while the
mbines with the malic acid, and goes to
tom with it as an inſoluble powder. Waſh
ecipitate carefully with water, and then
oon it ſulphuric acid, diluted with water,
e liquor has a ſharp acid taſte without any
ſweetneſs which continues as long as any
mains in it. The ſulphuric acid forms an
e compound with the lead, leaving the
cid in the liquor. By waſhing the ſulphate
upon a filter, the pure malic acid is ob-
:ombined with water.

(947.) Vauquelin has aſcertained that it may be extracted in abundance from the houſe-leek, or *ſempervivum tectorum*, where it exiſts in union with lime. To the juice of the houſe-leek he added acetate of lead, as long as any precipitation took place. Having waſhed the precipitate, he decompoſed it by diluted ſulphuric acid, as directed by Scheele.

(948.) Malic acid has alſo been obtained by the action of nitric acid on ſugar. Equal parts of nitric acid and ſugar being diſtilled until they aſſume a brown colour, which happens when all the nitric acid is abſtracted; the oxalic acid which may have been formed, is precipitated by lime-water. Another acid remains which ſhould be ſaturated with lime, and filtered. Pour upon this filtered liquor acetate of lead until no more precipitation enſues. The precipitate is the malic acid combined with lead, which may be ſeparated by diluted ſulphuric acid as before.

(949.) Malic acid, thus obtained, is of a reddiſh brown colour, and very acid taſte. When evapourated it becomes thick, and viſcid, but does not cryſtallize. Expoſed in thin layers to a dry atmoſphere, it dries, and aſſumes the appearance of varniſh; and it is thought, at leaſt with certain additions to correct its ſolubility in water, it might make a very brilliant varniſh. It reddens vegetable blues. It is very ſoluble in water, and decompoſes ſpontaneouſly when kept in veſſels.

(950.) When heated in open veſſels, it ſwells, exhales acrid fumes, and leaves a porous and voluminous charcoal. When diſtilled, it yields acidified water, a large proportion of carbonic acid gas, a little carbureted hydrogen gas; and a porous coal is left in the retort.

(951.) Sulphuric acid converts part of it into charcoal; and nitric acid converts it into oxalic acid. Hence malic acid is compoſed of oxygen, hydrogen, and carbon, though the proportion of theſe ingredients has not been aſcertained. The carbon is ſuppoſed to be in great proportion. The affinities of this acid have not been aſcertained.

(952.) The malic has much reſemblance to the citric acid; but it differs from the latter, 1. In not forming cryſtals. 2. In forming a ſoluble ſalt with lime, while citrate of lime is almoſt inſoluble, even in boiling water. 3. In precipitating mercury, lead, and ſilver from nitrous acid, and even diluted ſolution of gold; while citric acid does not alter any of theſe ſolutions. 4. In having a leſs affinity than the citric acid for lime.

(953.) The malic acid combines with alkalis, earths, and metallic oxides, forming ſalts which have obtained the name of *malates*.

SECT. XXIII. GALLIC ACID.

(954.) AN excreſcence grows upon oak trees, in conſequence of the puncture of inſects, called the *gall-nut*, and this ſubſtance contains the gallic acid combined with tannin. This acid exiſts in a great variety of plants; and in the gall plant, from which it ſeems to have derived its name, it is found combined not only with tannin, but with a portion of camphor.

(955.) The Dijon Academicians were the firſt who publiſhed experiments on this ſubſtance in

1777;

1777; but it was Scheele who firſt obtained the gallic acid nearly in a ſtate of purity.

(956.) Having expoſed an infuſion of nut-galls a long time to the air, and occaſionally removed the mouldy cruſt which gathers on its ſurface, he obſerved that it depoſited a cryſtalline ſediment of an acid taſte. Having collected a large quantity of this ſediment, and waſhed it with cold water, he diſſolved it in hot water, filtered, and evapourated the liquid very ſlowly. It yielded an acid ſalt in cryſtals as fine as ſand.

(957.) Deyeux obtained the ſame acid by expoſing gall nuts in a large glaſs retort to a heat which was ſlowly and cautiouſly raiſed. The gallic acid was ſublimed in the form of white brilliant cryſtalline plates. But the heat muſt not be too great, and the proceſs muſt be ſtopped before any oil comes over; otherwiſe the labour will be loſt.

(958.) Mr Davy has pointed out another method for obtaining the gallic acid. After boiling carbonate of barytes, in an infuſion of gall-nuts, a bluiſh green liquor is obtained, containing gallic acid combined with barytes. The liquor being filtered, is ſaturated with diluted ſulphuric acid, which carries down the barytes in the ſtate of an inſoluble powder, and a limpid ſolution of gallic acid remains behind.

(959.) Mr Richter, having made an infuſion of gall-nuts in cold water, and paſſed it through a cloth, evapourated to dryneſs, by which a dark brown matter was obtained. On this alcohol was poured, when reduced to a fine powder, and more alcohol added until the whole gallic acid was extracted. The extracts being joined together were diſtilled until the reſidue approached to ſolidity. To this water was added, with a gentle heat, and a colourleſs aqueous ſolution of gallic acid was thus obtained. This ſolution being ſlowly evapourated, depoſited ſmall white priſmatic cryſtals of gallic acid. From one pound of galls, half an ounce of cryſtals were obtained by this proceſs.

(960.) When pure, the gallic acid is in the form of tranſparent octahedral plates. It taſtes acid, and ſomewhat aſtringent; and has a peculiar aromatic odour when heated.

(961.) It is ſoluble in 12 parts of cold water, and in 1½ parts of boiling water. The acid ſoon decompoſes when the ſolution is heated. Cold alcohol diſſolves one fourth of its weight of this acid, and when boiling hot, it diſſolves a quantity equal to its own weight. It is alſo ſoluble in ether.

(962.) By a moderate heat it ſublimes without alteration; but a ſtrong heat decompoſes, and converts it into an acid water, carbureted hydrogen gas, carbonic acid gas, oil, and charcoal. When diſtilled it yields oxygen gas, an acid liquor; and ſome gallic acid comes over unchanged, while charcoal remains in the retort. If what comes over into the receiver be repeatedly diſtilled, the ſame products are obtained, until the acid is wholly decompoſed. Or the acid may be wholly decompoſed by the repeated diſtillation of a ſolution of it in water.

(963.) The cryſtals of this acid do not alter by expoſure to the air; but when an aqueous ſolution of it is long expoſed, it becomes brown, mouldy at the ſurface, and the acid is deſtroyed. Scheele, by treating the gallic with the nitric acid, in the uſual way, converted it into the oxalic acid.

(964.) From theſe circumſtances it appears that the gallic acid, like the other vegetable acids, is compoſed of oxygen, hydrogen, and carbon, though the proportions have not been aſcertained. Mr Deyeux thought it contained a much larger proportion of carbon than enters into the compoſition of the carbonic acid; but his analyſis of this acid is not concluſive.

(965.) It diſplaces the carbonic acid, and combines with alkaline ſubſtances, and the ſalts it forms have obtained the name of *galates*; but theſe have ſcarcely been examined. When dropped into the water of barytes, ſtrontian, or lime, it produces a bluiſh red colour, and occaſions flaky precipitates conſiſting of the acid combined with theſe earths. It alſo precipitates ſolutions of glucina, yittria, and zirconia in acids, and this forms a teſt by which theſe are diſtinguiſhed from the other earths.

(966.) It changes the colour, and produces precipitates in many of the metallic ſolutions. Richter has ſhewn that it does not take iron from the ſulphuric acid, unleſs it be aſſiſted by a ſubſtance which has an affinity for that acid; and that it ſtrikes a black colour with all the oxides of iron. This however is denied by Prouſt and Berthollet, whoſe experiments ſeem to eſtabliſh an oppoſite opinion.

(967.) The gallic is reckoned one of the colorific acids, and it ſeems to produce this effect upon the oxides of metals, by making them approach to the metallic ſtate. Gold it completely reduces, when preſented to it in ſolution. Hence this acid is uſed as a teſt to diſtinguiſh metals, from the colour it ſtrikes when dropped into their ſolutions. But it is ſtill extremely doubtful whether the gallic acid poſſeſſes this property in itſelf, or owes it to a portion of tannin in combination with it.

SECT. XXIV. TANNIN.

(968.) This exiſts, in gall-nuts, in much greater proportion than the gallic acid; and it abounds in the bark of oak, willows, birch; in heath, moſs, and in almoſt every ſpecies of plants, though chiefly in thoſe of the ligneous genus. It has acquired its name from its great and indiſpenſable uſe in the tanning of leather. The Aleppo galls are thought to be moſt productive of this ſubſtance, as they diſſolve almoſt entirely in water, leaving only a few woody fibres. It abounds alſo in *catechu*, and a variety of other vegetable ſubſtances. Mr Davy having made a ſolution of 500 grains of Aleppo galls, and evapourated the water ſlowly, obtained 185 grains of dry extractive matter. He found this matter compoſed of

130 grs.	tannin,
31	gallic acid and extract,
12	mucilage and extract,
12	lime and ſaline matter.
185	

(969.) To obtain tannin in a ſtate of purity, ſeveral proceſſes have been adopted, none of which are ſatisfactory, though that practiſed by Trommſdorf appears the leaſt exceptionable. Three parts of gall-nuts were digeſted with 40 parts of water at the temperature 66°, during three days; and frequently ſtirred. The mixture being ſtrained through a linen cloth, other 40 parts of water were added to the galls; and the proceſs continued until the laſt portion of water came off colourleſs, and did not change ſolution of iron. Theſe infuſions being added, were gently evapourated down to one fourth in a porcelain baſon. The liquor was now paſſed through a thick linen cloth, by which a quantity of extractive was ſeparated. It was now evapourated to the conſiſtence of jelly and then placed on a flat porcelain diſh near a ſtove until it became perfectly dry.

(970.) The dry brown ſubſtance thus obtained being reduced to powder, was digeſted with ſucceſſive additions of alcohol, until it was certain that all the gallic acid was diſſolved and abſtracted. It was now conſidered as tannin conſiderably pure; but ſtill containing ſome mucilage, and extractive matter. It contained alſo a portion of ſulphate of lime, which was removed by diſſolving the whole in water, and pecipitating the lime by means of carbonate of potaſh. The liquid being ſeparated from this precipitate by filtration, was mixed with acetate of lead. A powder fell, conſiſting of the oxide of lead combined with tannin. This powder being waſhed and dried, was mixed with diſtilled water, and had a current of ſulphureted hydrogen gas paſſed through it. The lead was thus combined with the ſulphur, while the tannin diſſolved in the water. The liquid being now filtered, and ſlowly evapourated to dryneſs, the reſidue was as pure tannin as can be extracted from gall-nuts.

(971.) The tannin thus procured is of a brown colour, brittle, and breaks with a reſinous fracture. Its taſte is bitter, and like that of gall-nuts, very aſtringent.

(972.) It diſſolves in water, both hot and cold, forming a brown ſolution, which does not become mouldy by expoſure to air, nor decompoſe like the tannin which contains mucilage. It does not diſſolve in pure alcohol; though it diſſolves if the alcohol be diluted with water, even to the extent of $\frac{1}{10}$th. This fact led Richter to employ alcohol for ſeparating the gallic acid from tannin.

(973.) Prouſt, Davy, and Deyeux aſcertained that it combines with oxygen, which changes its nature. Thus nitric and oxymuriatic acids change it into a brown matter ſoluble in alcohol, ſimilar to an extract; and peroxide of tin produces the ſame effect, perhaps by imparting oxygen.

(974.) It has an affinity for almoſt all the metallic oxides, and renders their ſolutions nearly inſoluble in water. Hence the infuſion of gall-nuts readily precipitates metallic ſolutions, and conveys to each a different colour. The colours, as far as known, are as follow:—

Gold,	Brown,
Silver,	Brown,
Mercury,	Orange yellow,
Copper,	Brown,
Biſmuth,	Citron yellow,
Iron,	Black,
Lead,	White,
Nickel,	Grey,
Antimony,	White,
Tellurium,	Yellow,
Uranium,	Chocolate,
Titanium,	Reddiſh brown,
Chromium,	Brown,
Columbium,	Orange.

(975.) One remarkable property of tannin is its combination with *glue* or *gelatine* as it is called by chemiſts, producing a compound which is inſoluble in water. It is this property which renders it of ſo much uſe in the tanning of leather; for by combining with the glue in the ſkins of animals, it renders it inſoluble, and thus prevents the putrefaction which would enſue from the water abſorbed by the ſkins.

(976.) This property alſo renders ſolutions of tannin uſeful inſtruments in the hands of chemiſts for detecting gelatine, and precipitating it from liquids; while ſolutions of gelatine are uſeful for detecting and precipitating tannin. For the laſt purpoſe iſinglaſs, which is a very pure gelatine, is commonly uſed, in the proportion of 120 grains diſſolved in 20 ounces of water. When this is dropped into a ſolution of tannin, both ſoon go to the bottom; but the gelatine muſt not be added in exceſs, or it will rediſſolve the tannin. In the ſame manner a ſolution of tannin precipitates gelatine from animal fluids and the aqueous ſolutions. Mr Davy analyſed the inſoluble compound of gelatine and tannin, after it had been dried in a temperature of 150°, and found it compoſed of

54 gelatine,
46 tannin,
———
100

(977.) Potaſh, ſoda, and ammonia, combine with tannin, and form compounds leſs ſoluble than pure tannin. In concentrated tannin, the fixed alkalis produce a precipitate, but ammonia throws down nothing. Theſe combinations do not precipitate gelatine, unleſs the alkalis be ſaturated with an acid.

(978.) When barytes or lime water is poured into a ſolution of tannin, the tannin is precipitated in union with the earth, and the water becomes limpid. This precipitate is inſoluble, and does not act upon glue until the earth be ſaturated by an acid. In a paper publiſhed by the Board of Agriculture, Mr Headrick ſtates that lime water being dropped into dark brown moſs water, precipitates all the colouring matter, and leaves the water limpid; and he aſcribes one effect of lime in converting moſs into ſoil to its combining with the tannin in the moſs, and rendering it inſoluble in water. Tannin combines with moſt of the acids and the compounds are more or leſs ſoluble.

(979.) When tannin is diſtilled, a part comes over unchanged. It alſo yields ſome empyreumatic oil, and a puffy coal remains, equal to about $\frac{1}{18}$th of the tannin diſtilled. The difficulty of procuring this ſubſtance in a ſtate of purity, has induced chemiſts chiefly to employ infuſions of gall-nuts, which renders their concluſions doubtful; becauſe we can not know what part of the effect ought to be aſcribed to the tannin, and what to the other ingredients in the compoſition of theſe nuts.

(980.) Solutions of nut-galls are much uſed by the dyers; and Dr Lewis made many uſeful experiments on the beſt mode of making writing ink. The following is the recipe which he found to make the beſt ink.

Logwood,	1 ounce,
Nut-galls in powder,	3,
Green vitriol,	1,
Pure water,	1 to 2 quarts.

The logwood and galls ſhould be boiled in the water, and new water added to compenſate the evapouration. Then ſtrain them through a cloth, and add the vitriol; and at the ſame time add from one to two ounces of gum arabic. To prevent the mouldineſs which is apt to riſe upon ink, ſome add a little cloves in powder.

(981.) Mr Prouſt is of opinion that there are various ſpecies of tannin in vegetables differing from each other like the oils, reſins, &c. and Mr Hatchett's experiments ſeem to confirm his opinion. But theſe differences may be owing to different ſubſtances in combination with tannin; and the truth cannot be known until an eaſy proceſs be found for obtaining tannin in a ſtate of abſolute purity.

(982.) We have hitherto treated of tannin as it is preſented by nature, in various tribes of the vegetable kingdom. But the ingenious Mr Hatchett has lately diſcovered a method of preparing

ARTIFICIAL TANNIN.

(983.) To prepare *artificial Tannin*, it is only neceſſary to digeſt diluted nitric acid on charcoal, with a moderate heat, until the whole, or nearly the whole, is diſſolved. Mr Hatchett uſually employed 100 grains of charcoal, and 500 grains of nitric acid, of the ſpecific gravity 1·40, diluted with twice its weight of water. This being heated in an open matraſs, conſiderable effervеſcence was produced, and much nitrous gas was emitted. After digeſting two days, more nitric acid was added, and the digeſtion continued until the charcoal was wholly diſſolved. This ſolution is of a dark brown colour, and being evapourated to dryneſs leaves a brown coloured maſs. To free it from the laſt portions of acid, Mr Hatchett found the beſt method was to diſſolve it repeatedly in water, and again evapourate to dryneſs with a gentle heat. This is *artificial tannin.*

(984.) In this way 100 grains of charcoal were converted into 120 grains of artificial tannin, of which Mr Hatchett ſuppoſed three grains to have been moiſture.

(985.) This tannin is of a brown colour, of conſiderable luſtre, and breaks with a vitreous fracture. Its taſte is bitter and highly aſtringent, but it has no ſmell. It diſſolves in cold and hot water, forming a tranſparent deep brown ſolution. Alcohol diſſolves it; and in this reſpect it differs from the natural tannin, unleſs we ſuppoſe the alcohol employed contained a portion of water.

(986.) The ſolutions of this tannin precipitate glue and iſinglaſs from water, and form compounds which are inſoluble both in hot and cold water. Mr Hatchett aſcertained that theſe precipitates are compoſed of

36 tannin,
64 iſinglaſs.

100

Hence this tannin poſſeſſes greater efficacy than the natural tannin, becauſe from (976), compared with this analyſis, it will be ſeen that a ſmaller proportion of it produces a greater effect. After the precipitation a portion of extract remained in the liquor; and hence it is combined in the artificial as well as in the natural tannin

(987.) The ſulphuric and muriatic acids precipitate artificial tannin from ſolution, without altering its properties. Nitric acid does not alter it, though repeatedly diſtilled from it; and in this reſpect it differs from natural tannin, which nitric acid deſtroys.

(988.) Artificial tannin unites with all the alkalies, and with the alkaline earths. With the latter it forms compounds which are ſcarcely ſoluble in water. It precipitates moſt of the metallic oxides from acid ſolutions, and the colour of the precipitates is uſually brown; inclining to chocolate.

(989.) Artificial tannin is decompoſed by the action of fire, and its conſtituent ingredients are found to be oxygen, azote, hydrogen, and carbon; of which the carbon predominates, but the proportions have not yet been aſcertained.

(990.) This tannin may be procured from mineral and animal charcoal as well as that of wood; and from a variety of ſubſtances, ſuch as camphor, reſins &c. which contain a great proportion of carbon in their compoſition. If camphor or reſins be diſſolved in ſulphuric acid, and precipitated by cold water. From the dried powdery precipitate alcohol extracts a tannin differing in ſome reſpects from that which is formed from charcoal; but which acquires the ſame properties by digeſting in a little nitric acid.

(991.) Hence Mr Hatchett obtained three ſpecies of artificial tannin, which poſſeſſed ſome ſhades of difference in their properties. 1. Tannin formed by the action of nitric acid on charcoal. 2. By digeſting nitric acid on indigo and reſins. 3. By diſſolving reſins and camphor in ſulphuric acid

(992.) Artificial tannin has been found to anſwer extremely well in the proceſs of making leather; but unleſs ſome cheaper method be diſcovered of making it than by the nitric acid, it is doubtful if ever it can be ſubſtituted in place of bark.

SECT. XXV. BENZOIC ACID.

(993.) This acid is obtained from a reſin called Benzoin, or Benjamin, which abounds in ſeveral plants, but eſpecially the *ſtyrax benzoë*, a tree which grows in Sumatra, and other parts of the Eaſt Indies. It is likewiſe obtained from the balſam of Peru and Tolu; from venilla, and liquid amber. It exiſts in the urine of children, and in that of ſome adults; but conſtantly in the urine of quadrupeds which live on graſs and hay, eſpecially in that of the horſe and cow. It is ſuppoſed to exiſt in many of the graſſes, eſpecially in the *anthoxanthum odoratum*, which gives the fine ſcent to hay.

(994.) This acid was firſt deſcribed, 1608, by Blaiſe de Vigenere, under the name of *flowers of benzoin*; but is now called *benzoic acid.*

(995.) It is uſually obtained by *ſublimation*, from a quantity of coarſely powdered benzoin put into an earthen pot, the mouth of which is covered by a cone of thick paper to which the benzoic acid attaches itſelf. The heat applied is that of a ſand-bath, well regulated; becauſe without this, empyreumatic oil is apt to riſe, and contaminate the acid. Neuman propoſed moiſtening the benzoin with alcohol, and the acid riſes after the alcohol is expelled. Geoffroy, in 1773, obtained this acid by digeſting benzoin in hot water, which depoſits cryſtals of the acid while the water cools.

(996.) Scheele obtained the benzoic acid by diſſolving benzoin in water mixed with lime, ſo as to be of the conſiſtence of milk poured upon the benzoin in ſmall portions at a time. Theſe were boiled together in a tinned pan, and conſtantly ſtirred, until the lime had combined with the acid. The liquor was then allowed to ſettle, and the limpid part decanted off. Succeſſive additions of water were made, boiled, ſtirred, and decanted as before, until the whole acid was extracted in union with the lime. The milky lime-water ought not to be added to the benzoin in too large quantity at a time, otherwiſe the latter is apt to coagulate, and will not yield its acid. All theſe portions of decanted liquor being added and filtered; and waſhed upon the filter with hot water, the acid in union with lime, is obtained in limpid ſolution. The liquid being now conſiderably reduced by evapouration, muſt be ſtrained into a glaſs veſſel, to extract ſome which diſſolves in it. When cool, muriatic acid is added, with conſtant ſtirring, until no precipitation enſues, or until the liquor begins to taſte ſour. The muriatic acid combines, and remains ſoluble with the lime; while the benzoic acid is precipitated in the form of a fine powder.

(997.) Mr Hatchett digeſted benzoin in ſulphuric acid, and, from the compound, ſublimed the benzoic acid by a gentle heat. By this proceſs he obtained this acid in a high ſtate of purity.

(998.) Benzoic acid, thus obtained, is a light white powder; its taſte acrid and ſomewhat bitter; its ſmell peculiar and aromatic; its ſpecific gravity 0·667. It hardly affects vegetable blues, but reddens infuſion of turnſol, eſpecially when hot.

(999.) With a moderate heat it melts into a ſoft brown ſpongy ſubſtance, and forms a radiated cruſt on its ſurface while cooling. A greater heat volatilizes this acid, with a ſtrong odour. In contact with flame it burns, without leaving a reſiduum. Diſtilled in cloſe veſſels, part ſublimes unaltered, part decompoſes into oil and carbureted hydrogen gas.

(1000.) It is ſcarcely ſoluble in cold water; but 480 grains of boiling water diſſolve 20 grains of it: 19 grains of which are depoſited, when the water cools, in long white feather like cryſtals.

(1001.) It diſſolves in the concentrated ſulphuric, ſulphurous, and nitric acids, rendering them ſomewhat brown, and is precipitated from theſe acids by adding water. Acetic acid alſo diſſolves it when hot, and drops it in cryſtals when it cools, in the ſame way as water. The other acids are not known to have any effect upon it.

(1002.) Alcohol diſſolves it copiouſly, and boiling alcohol takes up its own weight of this acid. It is precipitated from alcohol by the addition of water.

(1003.) It is not known to oxidize metals; but it combines with alkalis, earths, and metallic oxides, forming ſalts which are called *benzoates*.

(1004.) This acid was formerly more frequently uſed as a medicine than now. The order of its affinities is as follows:—

White oxide of arſenic,
Potaſh,
Soda,
Ammonia,
Barytes,
Lime,
Magneſia,
Alumina.

Sect. XXVI. Succinic Acid.

(1005.) It is ſo called from the Latin name of amber, from which it is extracted. Much difference of opinion has prevailed concerning the nature of amber, whether it be originally an animal, a vegetable, or mineral ſubſtance. It was in high eſteem among the ancients; was poliſhed for ornament; and as its electrical properties were early diſcovered, it was ſuppoſed to poſſeſs many powerful, though unaccountable, medical virtues. It is occaſionally found on the ſea-ſhores of many countries; and is dug from below the ſurface of the earth, in Pruſſia, and other countries ſituated on the Baltic. When expoſed to heat, a volatile ſalt is ſublimed from it, which Agricola called the ſalt of amber. Boyle firſt diſcovered it to be an acid; and it is now known by the name of *ſuccinic acid.*

(1006.) To prepare ſuccinic acid, a retort is half filled with powdered amber; the powder covered with a quantity of dry ſand; a receiver luted on, and the retort placed in a ſand-bath. On applying a moderate heat, there firſt paſſes over water, then acetic acid, and then the ſuccinic acid attaches itſelf to the neck of the retort. If the diſtillation be continued, there paſſes over a thick brown oil, which has an acid taſte.

(1007.) To ſeparate the ſuccinic acid from the oil, it is diſſolved in boiling water, and thrown upon a filter on which there is a ſmall quantity of cotton previouſly moiſtened with oil of amber. The oil moſtly attaches itſelf to the cotton, while the acid paſſes through in union with the water. This water being ſlowly evapourated, the acid is obtained in a cryſtallized form. Morveau has ſhewn that it may be rendered perfectly pure by diſtilling from its cryſtals a ſufficient quantity of nitric acid, provided the heat applied be not ſo great as to ſublime the ſuccinic acid along with the nitric.

(1008.) The cryſtals of this acid are tranſparent, white, ſhining; and their figure is foliated, triangular, and priſmatic. They have a ſour taſte, but are not corroſive. They redden tincture of turnſol, but have little effect upon other vegetable colours. With the heat of a ſand-bath, this acid is partly ſublimed unchanged, and partly decompoſed, leaving a coaly reſiduum.

(1009.) At the temperature 50°, 96 parts of water diſſolve one of this acid. At 52°, one part of the acid is diſſolved in 24 of water; and at

212°, water diſſolves the half of its weight, and the acid cryſtallizes as the water cools; but ſtill retains more of the acid in ſolution than it can diſſolve at the ſame temperature. It diſſolves in boiling alcohol in the proportion of 177 parts of the acid to 240 of the alcohol, and again ſhoots into cryſtals as the ſolution cools.

(1010.) The ſulphuric and nitric acids diſſolve but do not decompoſe it, when aſſiſted by heat. Muriatic acid does not act upon it when cold, but when heated, it forms with it a gelatinous coagulum.

(1011.) With ſoda it forms a ſalt which cryſtallizes in four and ſix ſided priſms. When this ſalt is diſtilled in a retort, the ſuccinic acid is completely decompoſed. Diluted acetic acid, and brown oil paſs over. Carbonic acid gas, and carbureted hydrogen gas are diſengaged, and there remains in the retort ſoda and charcoal. Hence this acid is compoſed of oxygen, hydrogen, and carbon; but the proportions have not been aſcertained.

(1012.) This acid combines with alkalis, earths, and metallic oxides; and the ſalts it forms are called *ſuccinates*.

(1013.) The order of its affinities follows:

Barytes,
Lime,
Potaſh,
Soda,
Ammonia,
Magneſia,
Alumina,
Metallic oxides.

Sect. XXVII. Saclactic Acid.

(1014.) This was diſcovered by Scheele in 1780, when he was preparing oxalic acid from ſugar of milk. He called it *acid of the ſugar of milk*, and the French chemiſts afterwards gave it the name of *ſaclactic acid*. Fourcroy has lately named it *mucous acid*, becauſe it is prepared from gum arabic, and other mucilaginous ſubſtances.

(1015.) Saclactic acid is thus prepared. Having put one part of gum arabic, or other ſimilar gum, into a retort, pour upon it two parts of nitric acid, and digeſt them a ſhort time with a moderate heat. Nitrous gas, and carbonic acid gas come over; and the mixture being now allowed to cool, a white powder drops to the bottom. This being thrown upon a filter, and waſhed with cold water, is ſaclactic acid in a ſtate of purity.

(1016.) It forms a white gritty powder, of a ſlightly acid taſte. Is ſcarcely ſoluble in cold water, but is ſoluble in 60 parts of its weight of boiling water, and the ſolution reddens the infuſion of turnſol. At the temperature of 53·7°, its ſpecific gravity is 1.0015. The ſolution in boiling water, on cooling, depoſits about ¼th part of the acid in the form of cryſtals.

(1017.) When this acid is diſtilled there comes over an acid liquor, which cryſtallizes in needles on cooling, a red coloured acrid oil, carbonic acid gas, and carbureted hydrogen gas. A large proportion of charcoal remains in the retort. Hence this acid ſeems compoſed of the ſame ingredients with the other vegetable acids, though the proportions are not aſcertained.

(1018.) With the alkalis it forms ſoluble ſalts, which cryſtallize on cooling. It is not known to act on any of the metals; but with the earths and metallic oxides, it forms ſalts which are almoſt inſoluble. It throws down a white precipitate when poured into the nitrates of ſilver, mercury, or lead. The combinations it forms with theſe bodies are called *ſaccolates*.

(1019.) According to Bergman, the following is the order of the affinities of ſaclactic acid:

Lime,
Barytes,
Magneſia,
Potaſh,
Soda,
Ammonia,
Alumina,
Metallic oxides.

Sect. XXVIII. Camphoric Acid.

(1020.) This acid, as the name imports, is obtained from camphor, a concrete ſubſtance which exudes from the *laurus camphora Lin.* a ſhrub of the Eaſt Indies. Camphor is ſo volatile that it cannot be melted in open veſſels, and when placed under hot water, its vapour riſes and may be burnt at the ſurface. When burnt in contact with oxygen, water is formed, charcoal is depoſited, and carbonic acid gas is diſengaged. Hence it conſiſts of carbon and hydrogen, the latter being probably in great proportion.

(1021. The camphoric acid was firſt diſcovered by Koſegarten, in conſequence of diſtilling nitric acid eight times ſucceſſively off camphor. The proceſs, according to La Grange, is as follows:—Put into a retort one part of camphor, and eight parts of nitric acid, of the ſpecific gravity of 1·33. Diſtil with a moderate ſand heat. Some camphor riſes, and a great quantity of nitrous gas, and of carbonic acid gas, is emitted. The proceſs muſt be repeated three times on the ſame camphor, with equal additions of acid each time, ſo that 24 parts of nitric acid are neceſſary on the whole, for one part of camphor. After the third diſtillation, the retort being allowed to cool, cryſtals are depoſited, which are the *camphoric acid;* and their weight is ſomewhat leſs than that of half the camphor employed. The cryſtals may be waſhed with cold water, and dried on blotting paper.

(1022.) The cryſtals of camphoric acid are of a ſnowy whiteneſs, and parallelopiped form. They effloreſce in the air, by parting with the water of compoſition.

(1023.) The acid is ſoluble in 200 parts of cold water, and boiling water diſſolves one twelfth of its weight. It has a ſlightly acid and bitter taſte, a ſmell like that of ſaffron; and reddens vegetable colours. It is ſoluble in the ſulphuric and muriatic acids. Alcohol diſſolves it; and the ſolution being left in contact with the air, the acid cryſtallizes.

(1024.) When thrown upon ignited coals, it emits a denſe aromatic vapour, and is entirely diſſipated. By a gentle heat it melts and is ſublimed. When oxygen gas is paſſed through it in a heated porcelain tube, the acid is ſublimed, without undergoing any change. But when it is diſtilled it firſt melts, and then ſublimes; and its properties are then found to have undergone a change. It now acquires a ſtrong aromatic ſmell; its taſte is leſs acrid; and it no longer is ſoluble in water; nor reddens the tincture of turnſole.

(1025.) The compounds which this acid forms with the alkalis, earths, and metallic oxides, are called *camphorates*. Its conſtituent parts have not been aſcertained.

(1026.) The following is the order of its affinities,

Lime,
Potaſh,
Soda,
Barytes,
Ammonia,
Alumina,
Magneſia,

SECT. XXIX. SUBERIC ACID.

(1027.) This acid is obtained from cork, which is the bark of the tree *quercus ſuber Lin.* From *ſuber* the Latin name of the tree, the acid derives its name. This acid was long confounded with the oxalic, until Bouillon La Grange proved it to poſſeſs properties different from thoſe of any other acid.

(1028.) To obtain ſuberic acid, ſix parts of nitric acid of ſpecific gravity 1·261 are poured on one part of grated cork, or broken chips of cork, and the mixture is diſtilled as long as red vapours continue, to eſcape. A yellow matter like wax riſes to the ſurface of the liquid; and while it is yet hot, it is poured into a glaſs or porcelain veſſel, placed in a ſand-bath over a gentle fire, and conſtantly ſtirred with a glaſs rod. The matter becomes thick; and when white vapours begin to riſe, the veſſel is removed from the ſand-bath, and the matter is conſtantly ſtirred until it becomes cold. An orange coloured maſs is thus obtained, of a ſtrong and pungent odour while hot, and of a peculiar aromatic ſmell when cold. Its conſiſtence is that of honey.

(1029.) To ſeparate the ſuberic acid from this maſs, boiling water is to be poured upon it, and the heat kept up until it becomes liquid. It muſt then be thrown upon a filter, which keeps back what is inſoluble in water. The filtered liquor, as it cools, becomes muddy, throws up a pellicle to its ſurface, and depoſits a powdery ſediment. The ſediment being ſeparated by filtration, the liquor ſhould be evapourated to dryneſs by a gentle heat. The maſs thus obtained is *ſuberic acid*.

(1030.) Suberic acid, thus obtained, does not cryſtallize. It taſtes ſour, and ſlightly bitter; reddens vegetable blues; and when dropped into a ſolution of indigo in ſulphuric acid (commonly called *liquid blue*) it changes its blue colour into a green.

(1031.) Water from 60° to 70° of temperature diſſolves only a very ſmall proportion of this acid, but boiling water diſſolves half its weight of it. If it be impure, it attracts moiſture when expoſed to the air. Expoſed to light, and eſpecially the direct rays of the ſun, it ſoon becomes brown.

(1032.) Expoſed to heat in a matraſs, it ſublimes, and the acid is depoſited on the inſide of the glaſs in zones of different colours. A ſtronger heat converts it into a ſubſtance reſembling diſtilled oil. It is not completely diſſolved by the other acids, and alcohol, when mixed with it, developes an aromatic ether.

(1033.) It converts the blue nitrate and ſulphate of copper into a green; the green ſulphate of iron into a deep yellow; and the ſulphate of zinc into golden yellow. It oxidizes ſilver, mercury, copper, lead, tin, iron, biſmuth, arſenic, cobalt, zinc, antimony manganeſe, and molybdenum. It is not known to act on any of the other metals.

(1034.) This acid combines with alkalis, earths, and metallic oxides, and the ſalts it forms with theſe ſubſtances, are called *ſuberates*.

(1035.) The affinities of the ſuberic acid are in the following order.

Barytes,
Potaſh,
Soda,
Lime,
Ammonia,
Magneſia,
Alumina,
Metallic oxides.

SECT. XXX. MELLITIC ACID.

(1036.) This acid is derived from a mineral of a honey-yellow colour, which has only been found among the beds of wood-coal, at Arten in Thuringia, and in Switzerland. Induced by the accidental circumſtance of its colour, which varies conſiderably, Werner gave to this ſubſtance the name of *honigſtein* (honey-ſtone); which foreign mineralogiſts changed into *mellite*, from the Latin name of honey.

(1037.) Mellite is in ſome degree combuſtible, and it is ſuppoſed to have been originally of vegetable origin, and only an imperfect variety of foſſil coal. Various reſults were obtained by different chemiſts who analized it; but in 1799 Klaproth aſcertained it to be compounded of alumina and a peculiar acid, to which he aſſigned the name of *mellitic*; and his concluſions were confirmed by Vauquelin.

(1038.) To obtain the mellitic acid, reduce the mineral called mellite to powder, and boil it in about 72 times its weight of water. The alumina ſeparates from the acid in flakes; and having filtered and ſufficiently evapourated the liquor, the acid is obtained in a cryſtallized form.

(1039.) Theſe cryſtals are either fine needles, or ſmall ſhort priſms, with ſhining faces. They are conſiderably hard. Their colour is browniſh; their taſte ſweetiſh-ſour, which changes to bitter. They are not very ſoluble in water, though their degree of ſolubility is not aſcertained.

(1040.) They are decompoſed by heat, emitting a copious ſmoke, and leave behind a quantity of aſhes. This acid is not convertible into the oxalic acid.

(1041.) From Klaproth's analyſis it appears that mellite is compoſed of the following ingredients.

46	Mellitic acid,
16	Alumina,
38	Water.
100	

(1042.) When the mineral is diſtilled in a retort, the acid is completely decompoſed, and its conſtituents enter into new combinations. In this way, from 100 grains of mellite, Klaproth obtained

54 cubic inches of carbonic acid gas
31 - - - - - hydrogen gas
38 grains of acidulous water
1 - - aromatic oil
9 - - charcoal
16 - - alumina.

It hence follows that mellitic acid, like moſt of the combuſtible or vegetable acids, is compoſed of oxygen, hydrogen, and carbon; though the proportion of theſe ingredients is not aſcertained. Though this acid in ſome particulars reſembles the oxalic, it differs in ſeveral reſpects, and chiefly in the nature of the compounds it forms with other ſubſtances.

(1043.) This acid combines with alkalis, earths, and metallic oxides, and the ſalts it forms are named *mellates*.—Its affinities have not been aſcertained.

Sect. XXXI. Lactic Acid.

(1044.) This acid forms ſpontaneouſly in milk, when it becomes ſour by expoſure to the air; or when the milk is agitated in the operation of churning. It was firſt inveſtigated by Scheele, who pointed out the following proceſs for obtaining it pure.

(1045.) Evapourate a quantity of ſour whey to one eight part of its former bulk, and paſs it through a filter to ſeparate the curd. Saturate the liquor with lime water, and phoſphate of lime goes to the bottom. Paſs it again through a filter, and dilute with three times its bulk of water. Into the diluted liquor drop oxalic acid until all the lime is carried to the bottom, and add a very ſmall quantity of lime water to aſcertain that oxalic acid has not been uſed in exceſs. Evapourate to the conſiſtence of honey, and pour in a ſufficient quantity of alcohol, which combines with the lactic acid. The liquor being again filtered, the lactic acid paſſes through in union with the alcohol. A ſmall quantity of water being added, and the liquor diſtilled with a gentle heat, the alchohol comes over, leaving the lactic acid in union with the water.

(1046.) Scheele obſerved that milk always yielded ſome vinegar by diſtillation, and pointed out a proceſs by which vinegar may be obtained from milk in conſiderable quantity. The affinities of the lactic acid are the ſame with thoſe of the acetic; and Bouillon La Grange has proved that this acid conſiſts of a mixture of the following ſubſtances. 1. Acetic acid; 2. Muriate of potaſh; 3. A little iron; 4. Animal matter.

(1047.) The lactic acid is therefore no longer held to be a peculiar acid, poſſeſſed of characteriſtic properties; but a compound of theſe ſubſtances.

Sect. XXXII. Laccic Acid.

(1048.) This acid is obtained from a ſpecies of *white lac*, a ſubſtance reſembling bees-wax, which forms the neſts of a kind of inſects in the neighbourhood of Madras. It was diſcovered by Dr Anderſon in 1786, and it is formed in the ſhape of ſmall cowry ſhells, by a ſpecies of the coccus, every way reſembling the inſect from which the Mexicans extract cochineal. Theſe inſects poſſeſs the art of collecting honey like bees, and when Dr Anderſon proceeded to multiply them with a view to make cochineal, he found his crop very much diminiſhed by the avidity with which the children he employed eat up their neſts, owing to their ſweet and agreeable taſte.

(1049.) In 1793, this ſubſtance was examined by Dr Pearſon, at the requeſt of Sir Joſeph Banks, and the laccic acid was extracted from it by the following proceſs. Two thouſand grains of white lac were expoſed to a degree of heat juſt ſufficient to melt them. As they grew ſoft and fluid, there oozed out 550 grains of a reddiſh watery liquid, which ſmelled like newly broken bread. To this liquid Dr Pearſon gave the name of *laccic acid*.

(1050.) It changes turnſol to a red colour; when heated ſmells like newly baken bread; after being filtered, has a ſaltiſh bitter taſte, but is not ſour. After ſtanding it grows turbid, and depoſits a ſmall quantity of ſediment. At the temperature of 60°, its ſpecific gravity is 1·025. Evapouration rendered it turbid; and after ſtanding it depoſited ſmall needle-ſhaped cryſtals among mucilaginous matter.

(1051.) When diſtilled, it came over at the temperature of 200°, and a ſmall quantity of extractive matter remained behind. The diſtilled liquor was tranſparent and yellowiſh; did not redden paper ſtained with turnſol, nor change to a blue, paper dipped in ſulphate of iron after being moiſtened with ſolution of potaſh; which ſhewed it was not the pruſſic acid. About 100 grains of this diſtilled liquor being evapourated until it grew turbid, and ſet aſide for a night, depoſited acicular cryſtals, which viewed through a lens, appeared in a group not unlike the umbel of parſley. They taſted bitteriſh.

(1052.) Another 100 grains being ſlowly evapourated to dryneſs, left a blackiſh matter behind, which did not evapourate when heated very hot on a naked fire: while oxalic acid was wholly diſſipated by a much lower degree of heat. Hence this differs from oxalic acid.

(1053.) This acid combined and efferveſced with the alkaline carbonates, and with that of lime. The ſalts it formed with potaſh and lime, being heated red hot, were reconverted into carbonates. Hence it appears that this acid is of vegetable origin; but whether it be a peculiar acid, or a mixture of ſome known acid with extraneous ſubſtances, the quantity examined by Dr Pearſon was too ſmall to enable him to aſcertain.

Sect. XXXIII. Pruſſic Acid.

(1054.) This ſubſtance is ſo called becauſe it enters into the compoſition of the *Pruſſian* or *Berlin blue*. This beautiful colonr was diſcovered by accident in 1710, by Dieſbach, a preparer of colours at Berlin, in conſequence of uſing an alkali in the precipitation of a decoction of cochineal, alum, and green vitriol, which he had procured from one Dippel, and which had been mixed with blood. Inſtead of a red colour, as he expected, a beautiful blue precipitate fell to the bottom. This gave riſe to the eſtabliſhment of a manufactory of the Pruſſian or Berlin blue, the nature of which was long kept a ſecret.

(1055.) Dr Woodward firſt publiſhed an account of the proceſs in the Philoſophical Tranſactions for 1724, which he ſays he obtained from a friend in Germany.—The proceſs is as follows.

(1056.) Detonate together four ounces of nitre, and as much tartar (carbonate of potaſh) in order to procure an extemporaneous alkali. Then add four ounces of dried bullock's blood; and having mixed them well together by rubbing in a mortar, put them into a crucible covered with a lid, in which there is a ſmall hole. Calcine them with a moderate fire until the blood ceaſes to emit ſmoke or flame that is capable of blackening any white body that is expoſed to it. Towards the end, increaſe the fire, ſo that the whole matter in the crucible may be moderately, but ſenſibly, red. While red hot, throw it into four pounds of water, and boil it for half an hour. Decant off this water, and add more, boil and decant off, until the water comes off without any taſte. Add all theſe portions of liquid together, and boil them down to four pounds. Diſſolve an ounce of ſulphate of iron in half a pound of water, and eight ounces of alum in four pounds of boiling water. Mix the three ſolutions of pruſſic alkali, alum, and ſulphate of iron, together while they are boiling hot. An efferveſcence takes place, and a powder is precipitated of a green colour. Separate this powder from the liquid by filtration, and pour upon it muriatic acid until it acquires a beautiful blue colour. Then waſh it with water on a filter, and dry it.—This is *Pruſſian blue*, or the pruſſic acid combined with iron.

(1057.) After the proceſs for making pruſſian blue was made known, much controverſy aroſe among the chemiſts concerning it. Mr Brown aſcertained that *beef* anſwered as well as blood, for preparing the alkali; and that alum only ſerved the purpoſe of extending the volume, and diminiſhing the intenſity of the blue colour. He found that the cauſe of the green colour of the firſt precipitation, was oxide of iron precipitated by the alkali, which had not combined with the colouring matter of the blood; and that the muriatic acid increaſed the intenſity of the blue colour, by diſſolving this oxide, while it did not operate on the colour derived from the blood.

(1058.) The ſubject was ſoon more deliberately examined by the celebrated Maquer, who confirmed the experiments of Brown, with ſeveral important additions.—The chief of theſe are, that the green colour is cauſed by the brown and yellow precipitates of oxide of iron, cauſed by part of the alkali which had not combined with the colour of the blood.—That the muriatic acid, and moſt of the other acids, combined with this oxide, without affecting what had combined with colouring matter, and hence changed the maſs to a bright blue colour.—That heat deſtroys the pruſſian blue, and changes it into a common oxide of iron.—That boiling with a cauſtic, or pure alkali, deprives the pruſſian precipitate of its blue colour; and that ſuch alkali conveys the colour to other ſolutions of iron in acids.—That no acid can ſeparate this colouring matter from iron after it is once combined with it.—That when an alkali is combined with this colouring matter, and mixed with an acid ſolution of iron, a double decompoſition takes place; the alkali combines with the acid, and the colouring matter with the iron, which forms pruſſian blue.

(1059.) Maquer ſuppoſed this colouring matter to be phlogiſton, and that pruſſian blue was iron ſuperſaturated with phlogiſton. Hence the alkali, charged with this colouring matter, obtained the name of the *phlogiſticated alkali*. Having obſerved that it coloured metals, but not earthy or other bodies, he propoſed it as an excellent teſt for diſcovering the preſence of metals in ſolutions. Morveau and Bergman advanced an opinion, that this colouring matter was an acid, though an unknown one.

(1060.) Scheele firſt obſerved that the pruſſian alkali, by expoſure to the air, loſt its power of communicating colour. But when he kept a quantity of it ſome time corked up in a large glaſs globe, its properties were neither changed, nor did it produce any change in the air in contact with it. But when he put a quantity of pruſſian alkali into a glaſs globe filled with carbonic acid gas, in 24 hours the alkali was rendered incapable of communicating any colour. On putting a ſlip of paper dipped in a ſolution of ſulphate of iron, and on which he had let fall two drops of alkaline ſolution, in order to precipitate the iron, into the ſame globe filled with carbonic acid gas, and containing a ſmall portion of the pruſſic alkali; in two hours, taking out the paper, and moiſtening it with muriatic acid, it was covered with a fine blue colour. It hence appeared that carbonic acid is capable of diſſolving the colouring matter, and of abſtracting it from the alkali with which it was firſt combined, and of afterwards depoſiting it on a new ſolution of iron; and to the action of carbonic acid Scheele aſcribed the deſtruction of the power of the alkali to communicate colour, by expoſure to the air.

(1061.) Scheele next attempted to obtain the colouring matter in an uncombined ſtate. For this purpoſe he mixed ten parts of powdered Pruſſian blue, with five parts of red oxide of mercury, and boiled them ſome time in 30 parts of water. The oxide of mercury combines with the pruſſian blue, and detaches it from its union with iron. It alſo forms with it a ſoluble ſalt; and the whole being thrown upon a filter, and well waſhed with hot water, the colouring matter was obtained in a liquid form, combined with the oxide of mercury, while the oxide of iron, formerly combined with it, being inſoluble, remained upon the filter. To the mercurial ſolution, 2½ parts of clean iron filings, and free from ruſt, were added, and at the ſame time one part of concentrated ſulphuric acid was poured in, and the mixture well ſhaken. The mercury (for reaſons that ſhall be afterwards explained) was deoxidized by the iron, and precipitated in its metallic form, and of courſe parted with the colouring matter: while the iron was diſſolved by the ſulphuric acid. Thus the colouring matter was left in the liquid in an uncombined ſtate, and was afterwards ſeparated from it by diſtillation. Some ſulphuric acid came over during the firſt diſtillation, which was ſeparated by diſtilling it again from carbonate of lime, or powdered chalk. Thus the colouring matter was obtained in a ſtate of purity.

(1062.) From experiments which Scheele made on this matter, after he had obtained it in a ſtate of purity, he firſt concluded that it conſiſted of ammonia and oil. But not being able to produce the matter by combining theſe ſubſtances together, he next inferred that it conſiſted of ammonia and charcoal. He produced pruſſian blue by combining theſe ſubſtances, in the following manner. Having mixed equal parts of powdered charcoal and potaſh, he melted and kept them red hot in a crucible about a quarter of an hour. He then thruſt down pieces of ſal ammoniac, and kept them at the bottom of the melted mixture, until they they ceaſed to give out vapours of ammonia. The mixture being now thrown into water, and the alkaline ſolution extracted and purified, it was found to poſſeſs all the properties of the pruſſic alkali. Thus Scheele ſucceeded in forming the colouring matter, by combining its conſtituent parts.

(1063.) Berthollet confirmed the diſcoveries of Scheele, with this addition, that a portion of the oxide of iron entered into the compoſition of the pruſſic acid, or colouring matter. He found that the pure pruſſic acid obtained by Scheele's proceſs, deprived oxy-muriatic acid of its oxygen, and converted it into common muriatic acid. The pruſſic acid, in conſequence of this combination, became more volatile, leſs capable of combining with alkalis, and precipitated iron, not of a blue, but of a *green* colour. Thus, by combining with oxygen, it is converted into a new ſubſtance, which may be called *oxy-pruſſic acid*. If more oxy-muriatic acid gas be made to paſs through the oxy-pruſſic acid, while it is expoſed to light, the acid ſeparates from the water in which it was diſſolved, and falls to the bottom in the form of an aromatic oil. Heat raiſes this oil in vapour, and it does not combine with iron. A pure fixed alkali decompoſes the green precipitate of oxy-pruſſic acid and iron, and converts the oxy-pruſſic acid into carbonate of ammonia.

(1064.) From theſe experiments Berthollet concluded that ammonia does not exiſt ready formed in the pruſſic acid; but that it is compounded of carbon, hydrogen, and azote, in proportions which he could not aſcertain. This concluſion was farther confirmed by Clouet, who formed a quantity of pruſſic acid by conveying ammoniacal gas through a tube containing charcoal, which was ſtrongly heated. Fourcroy, Vauquelin, and other chemiſts, think the pruſſic acid alſo contains oxygen in its compoſition, though the experiments of Berthollet render this very improbable.

(1065.) The pruſſic acid, when obtained pure by Scheele's proceſs, forms a colourleſs ſolution in water. It emits a ſtrong ſmell, reſembling that of peaches, or of bitter almonds. It has a ſweetiſh, acrid, and hot taſte, which is apt to excite coughing. It does not alter vegetable blues. Taken internally it is highly poiſonous, and ſmall animals are deſtroyed by its fumes. This acid is ſuppoſed to exiſt in bitter almonds, and in the leaves of laurel; and the poiſonous qualities of water diſtilled from theſe bodies is aſcribed to the pruſſic acid it contains, as it is found in theſe waters in conſiderable quantity. It is very volatile; and Grindel, by diſtillation of pruſſian blue, obtained the acid in the gaſeous form, in which ſtate it combined with liquid potaſh, which, by evapouration, formed cryſtals poſſeſſed of all the properties of pruſſiate of potaſh. This acid is leſs ſubject to decompoſition by heat, than any of the vegetable acids; and it is only formed when the alkali and blood are expoſed to a red heat.

(1066.) The pruſſic acid is much uſed, not only in dyeing, and in producing beautiful pigments with the oxide of iron and of other metals; but it is alſo much uſed as a reagent in chemical reſearches, to detect the preſence, and to aſcertain the ſpecies of metals, from the colour of their precipitates. For this purpoſe it may either be uſed, 1. In a pure ſtate. 2. United to alkalis. 3. United to alkalis and metallic oxides, ſo as to form a triple compound. Or 4. United to metallic oxides alone.

(1067.) 1. In a pure ſtate, Scheele aſcertained that it acted very feebly on metallic ſolutions, and only occaſioned three precipitates, namely

Nitrate of ſilver,	white,
Nitrate of mercury,	black.
Carbonate of iron,	green becoming blue.

It renders the precipitate of gold by alkaline carbonates white, and expels carbonatic acid from the precipitate of ſilver by the ſame alkalis. It diſſolves red oxide of mercury, and forms with it a ſalt which may be obtained in cryſtals. It efferveſces with the precipitate of copper by the carbonate of potaſh, and gives it a ſlight orange colour. Though it does not precipate ſolutions of iron, it efferveſces with the precipitate of iron by carbonate of potaſh, and renders it blue. With a ſimilar precipitate of cobalt it efferveſces, and renders it yellowiſh brown.

(1068.) 2. Though this acid combines with all the alkalis, it is commonly uſed in combination with the potaſh, which conſtitutes the pruſſian alkali, or *pruſſiate of potaſh*. In this combination it acts upon a metallic oxide by double affinity, as already explained. The alkali combines with the acid which held the oxide in ſolution, while the pruſſic acid combines with the oxide, forming an inſoluble compound of a peculiar colour. The alum uſed in the formation of the pruſſian blue is alſo decompoſed by the potaſh; and though its earth does not combine with the pruſſic acid, it ſerves to enlarge the volume, and increaſe the livelineſs of the blue, as formerly explained. From the experiments of Scheele, Richter, and Bucholz, we learn that the alkaline pruſſiates act with greateſt force upon metallic ſolutions, and produce more beautiful precipitates than any other preparations of this ſubſtance. But the alkaline pruſſiates are liable to be decompoſed by expoſure to the air; by carbonic and the other acids; and hence they cannot be kept any time in a ſtate of energy.

(1069.) 3. As a reagent, chemiſts have therefore been obliged to have recourſe to the triple compound, which is uſually obtained by digeſting pure potaſh upon pruſſian blue. In this way the *ferruginous pruſſiate of potaſh* is formed, compoſed of oxide of iron, pruſſic acid and potaſh, a triple ſalt of a yellow colour, which cryſtallizes in flat cubes. It is uſed to detect metallic bodies by the colour of their precipitates, and eſpecially to detect and precipitate iron from ſolutions, which it does of a blue colour.

(1070.) 4. The pruſſiate of mercury is the only known ſoluble combination of this acid with a metallic oxide, which was deſcribed above. Its ſolution in water is colourleſs, it has a diſagreeable metallic taſte, and it cryſtallizes in needles. Dr Wolladen has uſed it with advantage in ſeparating *palladium* from *platinum*.

(1071.) *Zirconia* and *yttria* are the only earthy bodies which are precipitated by the pruſſiates; and in this reſpect they reſemble the metallic oxides.

(1072.) The affinities of the pruſſic acid are the following

Barytes,
Strontites,
Potaſh,
Soda,
Lime,
Magneſia,
Ammonia,
Metallic oxides.

SECT. XXXIV. SEBACIC ACID.

(1073.) This acid is alſo called the *acid of fat*, or of *tallow*, and is obtained by the diſtillation of animal fat, eſpecially of hogs lard. The penetrating fumes which riſe from melted tallow, which affect the lungs, had long been obſerved, though little attention had been paid to their qualities. This object firſt attracted the attention of M. Grutzmacher, who publiſhed a diſſertation *De Oſſium Medulla* in 1748. He was followed by Rhades, Segner, and Crell, the latter of whom publiſhed diſſertations on this ſubject 1780 and 1782. Thenard examined the ſubject in 1801, and found that the acids procured by the former chemiſts, were either the acetic, or the acid they had employed to extract the ſebacic acid. Thenard found that a peculiar acid was formed during the diſtillation of tallow, and his reſults were confirmed by Mr Roſe, in 1804.

(1074.) To procure ſebacic acid, diſtil hog's lard, and waſh the product with hot water. Separate this water, and drop into it acetate of lead. The lead combines with the ſebacic acid in the liquor, and goes to the bottom in the form of a flaky precipitate. This precipitate being waſhed and dried, muſt be heated and mixed with the ſulphuric acid. This acid combines with the lead, and diſplaces the ſebacic acid, which floats upon the ſurface in the form of liquid fat. This ſhould be carefully ſkimmed off, and it is the *ſebacic acid*. The acid may alſo be obtained by evapourating the water employed in waſhing the product of diſtilled hogs lard. Or this water may be ſaturated with potaſh, and afterwards precipitated with acetate of lead, as above.

(1075.) During the diſtillation great quantities of the carbonic acid, and of the carbureted hydrogen gaſes come over; and there drops into the receiver a yellow coloured water which ſhould be ſet aſide; as it contains the acetic acid, but no ſebacic acid. The ſebacic acid is contained in a great portion of oily matter, of the conſiſtence of butter, which comes over, and is extracted from this matter by boiling it in water, and proceeding as above directed. The ſebacic acid is not abundant, a pound of hogs lard yielding about 40 grains, and tallow ſtill leſs.

(1076.) The ſebacic acid ſcarcely diſſolves in cold, but diſſolves in hot water in the proportion of one fourth of the weight of the water; and on cooling it cryſtallizes in the form of needles. Its colour is white, has no ſmell, has an agreeable ſour taſte, and leaves in the mouth an impreſſion of bitterneſs. It reddens the infuſion of turnſol. It melts like tallow, and cryſtallizes on cooling. It is decompoſed by ſudden and violent heat. Alcohol diſſolves it copiouſly, and alſo the fixed and volatile oils.

(1077.) It occaſions precipitates in acetate and nitrate of lead, in nitrate of ſilver, and in the acetate and nitrate of mercury. It combines with the alkalis and earths, and forms with them peculiar ſalts, which are called *ſebates*.

(1078.) A problem has long occupied the attention of dyers, to make the cochineal, or ſcarlet dye, faſten upon linen, cotton, and other vegetable ſubſtances. Many methods have been tried for this purpoſe, but all without effect. It has been thought by ſome, though without trial we cannot foreſee the effect, that were the cloth long boiled in ſolution of ſebacic acid, it would be aſſimilated to an animal ſubſtance, and combine with the ſcarlet dye. It is thought that this combination would the more probably take place, were the cochineal preſented to the cloth in union with ſome of thoſe metallic ſalts, which the ſebacic acid precipitates, and with whoſe baſes it forms inſoluble compounds. But all *a priore* reaſoning on this ſubject is inadmiſſible; and theſe hints are only thrown out that thoſe who have leiſure and opportunity may reduce them to the teſt of experiment.

SECT. XXXV. URIC ACID.

(1079.) This acid was diſcovered by Scheele in 1776, and was firſt called *lithic acid*. It is found in human urine, and is one of the component parts of urinary calculi. One ſpecies of calculus, reſembling wood in appearance and colour, is almoſt entirely compoſed of this ſubſtance.

(1080.) This acid is inſipid, inodorous, almoſt inſoluble in cold water, and only ſoluble in about 360 parts of boiling water, from which it ſeparates on cooling, in ſmall yellowiſh cryſtals. The ſolution of water reddens the tincture of turnſole.

(1081.) It is depoſited in the form of a browniſh red ſediment from urine, which is allowed to remain ſome time at reſt. When diſtilled, part paſſes over without decompoſition. It yields alſo ſome oil and water; cryſtallized carbonate of ammonia; and carbonic acid gas. A very black coal, without any alkali or lime, remains behind. It is hence ſuppoſed to be a particular compound of azote, carbon, hydrogen, and oxygen; but as the acid properties of this ſubſtance are equivocal, we reſerve the farther conſideration of it until we come to treat of animal ſubſtances.

Sect. XXXVI. Rosacic Acid.

(1082.) During certain diſeaſes a ſediment is depoſited from the urine, alluded to (1081) which from its colour reſembling that of bricks, has obtained the name of *laterious ſediment*. It is moſt abundant during fevers, and in gouty perſons, towards the termination of the paroxyſms. If the urine be heated, the ſediment is again diſſolved.

(1083.) This ſediment is a compound of the uric and roſacic acids, and to ſeparate them, it is only neceſſary to pour boiling water upon the ſediment. The roſacic acid, being much more ſoluble than the uric, paſſes through, and leaves the latter on a filter. Nitric acid, being dropped into freſh urine, combines with the roſacic acid, and forms with it an inſoluble depoſite. Prouſt alſo thinks it another characteriſtic of the roſacic acid, that it forms with a ſolution of gold a cloudy precipitate, of a violet colour.

Sect. XXXVII. Amniotic Acid.

(1084.) This acid has been found in the liquor of the amnios of the cow. It is white, has a ſlight acid taſte, and reddens tincture of turnſole. It is ſcarcely ſoluble in cold, but is more readily diſſolved in boiling water, from which, on cooling, it ſeparates in long needle ſhaped cryſtals. Expoſed to heat, it exhales ammonia, with pruſſic acid, and leaves behind a voluminous coal.

(1085.) It is diſtinguiſhed from the ſaclactic acid in that the latter does not exhale ammonia by diſtillation. The uric acid yields ammonia and pruſſic acid by heat, as well as the amniotic; but it is not equally ſoluble in warm water; nor does it cryſtallize in long brilliant needles; nor is the uric ſoluble in boiling alcohol like the amniotic acid.

(1086.) The characteriſtics of the three laſt acids are at leaſt ambiguous, and it ſeems doubtful whether they ought to be admitted into the claſs of peculiar acids, or to be held as compounds of acids with other ſubſtances.

Sect. XXXVIII. Formic Acid.

(1087.) This acid was firſt deſcribed by Mr Ray, in the Philoſophical Tranſactions 1671. Many experiments have been made upon it by ſucceeding chemiſts, and it is not yet fully decided whether it ought to be held as a peculiar acid, or a combination of the acetic acid with other ſubſtances. It is obtained from the *formica rufa*, or *red ant*, by the following proceſs, which is that of Margraff corrected by Richter.

(1088.) Infuſe any quantity of ants in about thrice their weight of water, and put the mixture into a ſilver or tinned copper ſtill, and diſtill off the water as long as no burnt ſmell appears. When a burnt ſmell is perceived, the diſtillation muſt be ſtopped. Saturate this diſtilled water with carbonate of potaſh, and evapourate to dryneſs. The ſalt thus obtained is *formate* of potaſh, or the formic acid in union with this alkali. To ſeparate the formic acid, mix this ſalt with as much ſulphuric acid, previouſly diluted with its weight of water, as is ſufficient to ſaturate the potaſh. Introduce the mixture into a retort, and diſtill ſlowly to dryneſs. The *formic acid* comes over, and it ſhould be rectified by a very ſlow ſecond diſtillation, to get rid of any portion of ſulphuric acid that may have come over during the firſt diſtillation.

(1089.) Formic acid is colourleſs like water. It cannot be obtained in a cryſtallized form. It differs from the malic acid, in that the latter cannot be diſtilled over with water. It differs in ſmell from the acetic acid. It taſtes ſour, and reddens vegetable blues.

(1090.) It alſo differs from acetic acid in ſpecific gravity, which varies from 1·102 to 1·113; whereas the moſt concentrated acetic acid is only 1·080. Notwithſtanding its ſuperior ſpecific gravity, it is not capable of neutralizing ſo much of the alkaline ſubſtances as acetic acid, as appears from the experiments of Suerſen. He reduced the formic and acetic acids, each to the ſpecific gravity 1·0525, and the proportions of the carbonates of potaſh, lime, and magneſia, which the ſame weight of each of theſe acids neutralized, may be ſeen in the following

Table.

	Formic Acid.	Acetic Acid.
Potaſh	336·8	465·1
Lime	166	231
Magneſia	150	213

(1091.) In theſe reſpects theſe two acids differ; but in other particulars they are very ſimilar to each other. Both form ſoluble compounds with the alkalies, the alkaline earths, and with the metallic oxides. The ſalts into whoſe compoſition the formic acid enters, are called *formates*.

(1092.) Mr Fiſher pointed out another difference between the formic and the acetic acid. The formic acid can be obtained by diſtillation from formate of lead; but the acetic acid cannot be diſtilled from acetate of lead, though we ſaw it is obtained from acetate of copper. Whether the formic be only the acetic acid combined with other ſubſtances, or if it be a peculiar acid differing from the acetic, is not yet fully decided by chemiſts; and the only mode of arriving at a ſatisfactory deciſion, would be by an accurate examination of the ſalts formed by combining the formic acid with various baſes.

Sect. XXXIX. Sulphureted Hydrogen.

(1093.) In treating of the gaſes, we pointed out the way in which this ſubſtance is prepared, (ſee 667, 668, &c.) It is called by the Germans *hydrothionic acid*. When uſed as a reagent in chemical analyſis, it is commonly diſſolved in water, and is then called *liquid ſulphureted hydrogen*. Or it is combined with alkalies, by cauſing a ſtream of ſulphureted hydrogen gas to paſs through an alkaline ſolution, until the liquid ceaſes to abſorb any more. Being then heated to expel the uncombined gas, the compound is called *alkaline hydroſulphuret*.

Sect. XL. *On the* Colorific Acids.

(1094.) Having thus detailed the mode of preparation, and the properties of all the known acids, excepting a few whoſe characters are doubtful, or not ſufficiently known, it remains that we ſhould offer a few remarks on what are called the rific acids. They have obtained this name m their producing precipitates in metallic solu- ns, each of which has a particular colour, which ries with the metal. Theſe acids are hence of at uſe in dyeing, and in the preparation of pigents; and they are much employed as reagents chemiſts, for detecting the preſence, and aſcerning the ſpecies of metals in ſolutions. The lorific acids are

1. Sulphureted hydrogen,
2. Pruſſic acid,
3. Gallic acid,
4. Tannin.

(1095.) The properties of theſe ſubſtances have been already fully detailed in their order; and it may be now obſerved that they agree with acids in combining with alkaline bodies; though they either do not contain any oxygen in their compoſition, or do not ſeem to owe their acid properties to that ſubſtance.

(1096.) The colour of the precipitates which each of theſe bodies forms, when dropped into ſolutions of the different metals, in conſequence of combining with the precipitated oxide, may be ſeen, as far as is known at preſent from the following

TABLE.

	Gold.	*Platinum.*	*Silver.*	*Mercury.*	*Palladium.*	*Rhodium*	*Iridium.*	*Oſmium.*	*Copper.*	*Iron.*
lphureted ydrogen.	Reduced	Reduced	Black	Black	Dark brown				Black	O. or ſulphur
ydroſulph. of potaſh.	Black	Black	Black	Black	Black ?	O			Black	Black
ruſſic acid.	Reduced	O	White	O						
ruſſiate of potaſh.	Yell.-White	O	White	White	Olive	O	O Becomes colourleſs		Green-iſh-yel.	Blue
allic acid.	Reduced	O	Yel.-brown	O-range yellow					Brown	Blue
nfuſion of Galls.	Reduced	O	Yel.-brown	O-range yellow			O Becomes colourleſs	Blue	O Becomes olive	Black
annin from Charcoal.	Reduced		Yellow	Yellow					Olive	Brown

TABLE *continued.*

	Nickel.	*Tin.*	*Lead.*	*Zinc.*	*Biſmuth.*	*Antimony*	*Tellurium*	*Arſenic.*	*Cobalt.*
Sulphureted hydrogen.	O	Brown	Black	White	Black	Orange		Yellow	O
Hydroſulph. of Potaſh.	Black	Black	Black	White	Black	Orange	Browniſh black.	Yellow	Black
Pruſſic acid.									
Pruſſiate of potaſh.	Green.	White.	White.	White.	White.	O	O	White.	Browniſh yellow.
Gallic acid.	White.	O	White.	O	Orange	White		O	O
Infuſion of Galls.	Grey	Brown	White.	O	Orange	White	Yellow	O	Yellow.-white.
Tannin from Charcoal.		Blackiſh grey.	Brown	O		Yellow		Yellow ?	

Table *continued.*

	Man-ganeſe.	*Chro-mium.*	*Molyb-denum.*	*Uranium.*	*Tungſten.*	*Titanium*	*Columbi-um.*	*Tantalium.*	*Cerium.*
Sulphureted hydrogen.	O		Choco-late.			O			O
Hydroſulph. of Potaſh.	White	Green	Reddiſh Brown	Brown yellow		Bottle green	Red cho-colate.		Brown
Pruſſic acid.									
Pruſſiate of Potaſh.	Yellow white	Green		Brown red	Brown	Graſs green	Olive		White
Gallic acid.	O								O
Infuſion of Galls.		Brown		Choco-late	Straw yellow	Reddiſh brown	Orange		O
Tannin from Charcoal.									

DIVISION IV.

Inflammable Liquids.

(1077.) We have given theſe ſubſtances this name, becauſe they are commonly in a liquid ſtate at the ordinary temperature of the atmoſphere. They have alſo been diſtinguiſhed by the name of Compound Inflammables, becauſe they are compounded of the inflammable bodies formerly deſcribed, which are eſteemed ſimple. The inflammable bodies which chiefly enter into their compoſition are *carbon* and *hydrogen*, and in ſome *oxygen* forms a conſtituent ingredient. Theſe only differ from the vegetable acids, in that the oxygen is not in ſufficient proportion to impart acid properties, though they may be claſſed as oxides. It ſeemed neceſſary to conſider theſe bodies in this place, on account of their great uſe as chemical reagents, in inveſtigating the properties of other bodies which are to be conſidered afterwards.

(1098.) The bodies to be conſidered under this Diviſion are,

1. Alcohol,
2. Ether,
3. Fixed oils,
4. Volatile oils,
5. Bitumens.

Sect. I. Alcohol.

(1099.) Alcohol is an Arabic word, and it means *the ſpirit*, being the firſt product that was obtained after diſtillation was invented. It is alſo called *ſpirit of wine*, becauſe it is obtained by diſtilling *wine*, *beer*, and other fermented liquors.

(1100.) We are informed in Geneſis that Noah planted a vineyard and drank wine; and it is probable the preparation of this liquor was diſcovered in very early times. Beer ſeems to have been uſed by the Egyptians in the time of Herodotus, and Tacitus informs us it was the drink of the ancient Germans. Though the Greeks and Romans knew the uſe of wine, it does not appear from their writings they were acquainted with diſtilled or ardent ſpirits. The northern nations of Europe knew intoxicating liquors from the earlieſt ages, and they ſeem to have chiefly uſed beer or mead, mixed with bitter and aromatic herbs.

(1101.) At what time the diſtillation of ardent ſpirits from fermented ſpirits was firſt invented, is not certainly known, though it would ſeem that this art was long practiſed among the Hindus, and other eaſtern nations, before it was known to the Arabians, or through them was adopted in Europe.

(1102.) When any fermented liquor is diſtilled, the firſt part that comes over is *ardent ſpirits*. Theſe products are known by different names, according to the ſubſtance from which they are obtained. Thus *brandy* is diſtilled from wine, *rum* from the fermented juice of the ſugar cane, *whiſky* and *gin* from the fermented infuſion of malt and grain. But whatever name may be given to ardent ſpirits, they all conſiſt of nearly three ingredients, namely, *water*, *ſpirit* or *alcohol*, and a little *oil* or *reſin*, to which they owe their flavour and colour.

(1103.) When the product of the firſt diſtillation is diſtilled a ſecond time, the portion which comes firſt over being a more pure ſpirit than before, is called *rectified ſpirits*, and is ſold under the name of alcohol, or ſpirit of wine. It ſtill however contains a portion of water, if not alſo of oil, from which it may be ſeparated by the following proceſs.

(1104.) A quantity of highly rectified ſpirit is mixed with a portion of very dry and warm *ſalt of tartar*, or carbonate of potaſh, which has a ſtrong affinity for water and oil, but does not combine with pure ſpirit. Being agitated, the potaſh combines with the water, and ſinks with it to the bottom of the veſſel, while the ſpirit floats at top. The ſpirit may then be decanted off, or drawn off by a ſiphon; or the ſolution of water and potaſh may be drawn by a ſtop-

hrough the bottom of the veſſel. The al-
thus obtained may be ſeparated from any
portion of alkali it may contain, by a very
iſtillation from a water-bath. The ſpirit
over and leaves the potaſh behind; but it
er not to continue the diſtillation to dry-
eſt water and oil may be forced over from
mnant of potaſh. This proceſs was firſt
ned by Suſly, and by its means *alcohol* is
ed in its higheſt ſtate of purity. Arnold de
Nova, profeſſor of medicine at Montpelier,
rmed tinctures and introduced them into
ne by the uſe of alcohol; and he ſeems firſt
e accurately deſcribed this liquid about the
the 13th century.

5.) Alcohol thus prepared and purified is a
colourleſs, and tranſparent liquid, of a pe-
ng and agreeable ſmell, and of a warm, ſti-
ng, and acrid taſte. It intoxicates much
owerfully than wine, or any other ferment-
ior. Its ſpecific gravity, when nearly pure,
o, but at the, temperature of 60° it is ſel-
obtained above 0·820, and the alcohol of
erce, which is only rectified ſpirits, is ſel-
nder 0·8371. Muſchenbroeck, by means of
tartar, obtained it as low as ·815, but in
l what is obtained by that proceſs is ſeldom
·821.

6.) Dr Black by repeated diſtillations from
e of lime, obtained alcohol as low as
Lowitz of Peterſburgh, and Richter, by
ing the ſame plan, obtained alcohol of a
wer ſpecific gravity than Dr Black. The
hemiſt having expoſed muriate of lime to a
at, reduced it to powder, and put it into a
while yet warm. He then poured upon it,
erent intervals, a quantity of alcohol, which
een purified to 0·821, nearly equal to the
of the ſalt. A violent heat was produced,
e retort being put upon a ſand-bath, and a re-
adjuſted, the liquid was made to boil. The
is ſoon diſſolved, and formed with the al-
a thick ſolution. What had come over in-
receiver was now poured back, and the
diſtilled with a very gentle boiling nearly
neſs. The alcohol thus obtained was of the
c gravity of 0·792, at the temperature of
By a ſimilar proceſs, Lowitz obtained alco-
the ſpecific gravity 0·791 at the tempera-
f 68°. Theſe may be conſidered as the
ſtates of alcohol, as there are no means
by which it can be deprived of more wa-
But as the laſt portions of water ſeem to ad-
o it with great force, it may poſſibly ſtill
n ſome water. The ſpecific gravity of al-
is diminiſhed in proportion as it is deprived
er; and it increaſes in proportion as water
ed to it. Hence the ſpecific gravity of this
is regarded as a ſtandard of its purity.

7.) Alcohol has never been known to con-
ith the moſt intenſe cold that can be applied. Mr Walker cooled a ſpirit of wine thermometer to —91°, without any appearance of congelation. It is alſo very volatile. Fahreinheit found that alcohol, which at the temperature of 60° was about ·820 of the ſpecific gravity, boiled at 176° of temperature. When of ·800 ſpecific gravity, it boils at 173½°. In *vacuo* it boils at 56°, ſo that were it not for the preſſure of the atmoſphere, this fluid would always be in the form of a gas, tranſparent and inviſible like common air.

(1108.) It is owing to its ſuperior volatility that alcohol, or ſpirit, ſeparates from the watery maſs in the proceſs of diſtillation, If managed with ſkill and attention, it is of no conſequence whether the proceſs of diſtillation be conducted rapidly or ſlowly. However violent the heat may be which is applied externally to the ſtill, the internal heat can never be greater than the vaporific point of the liquor. Each of the ingredients will come over in the order of their volatility, and it is only neceſſary to be more exact in turning aſide the laſt portions, which conſiſt of ſpirit combined with oils. By attention to this circumſtance our Scotch diſtillers, who charge and run a ſtill in leſs than five minutes, can make better ſpirits than formerly when it required a week or a fortnight to run a ſtill.

(1109.) Alcohol combines with water in all proportions: and as there is a mutual penetration of the liquids, and a variation of the ſpecific gravity of the mixture by every variation of the proportions, the ſpecific gravity of the various compounds of alcohol and water cannot be deduced by calculations from medium obſervations, but muſt be aſcertained by experiment in each individual caſe. Lowitz, as ſtated (1106) having purified alcohol to ·791 of ſpecific gravity, at temperature 68°, proceeded to aſcertain the ſpecific gravity of various mixtures of this highly rectified alcohol with different proportions of water. The importance of this object for revenue and commerce, induced the Britiſh government to employ Sir Charles Blagden to execute a very minute ſeries of experiments on this ſubject, which were publiſhed in the Philoſophical Tranſactions 1790; and the reſult of theſe were exhibited by Gilpin, in the ſame work, in 1794, in a ſet of Tables. The ſtandard alcohol employed, at temperature 60° was 0·825 of ſpecific gravity, of which, according to Mr Gilpin, 100 parts contained 4·5 of water; but according to Lowitz experiments, it muſt have contained

89	pure alcohol,
11	water.
100	

(1110.) The following abſtract from Mr Gilpin's Tables exhibits the ſpecific gravities of various mixtures of alcohol and water from 30° to 100°.

TABLE.

TABLE.

Heat.	Pure alcohol.	100 alcohol 5 water	100 alcohol 10 water	100 alcohol 15 water	100 alcohol 20 water	100 alcohol 25 water	100 alcohol 30 water	100 alcohol 35 water	100 alcohol 40 water	100 alcohol 45 water	100 alcohol 50 water	100 alcohol 55 water.
30°	·83896	·84995	·85957	·86825	·87585	·88282	·88921	·89511	·90054	90558	91023	·91449
35	83672	84769	85729	86587	87357	88059	88701	89294	89839	90345	90811	91241
40	83445	84539	85507	86361	87134	87838	88481	89073	89617	90127	90596	91026
45	83214	84310	85277	86131	86905	87613	88255	88849	89396	89909	90380	90812
50	82977	84076	85042	85902	86676	87384	88030	88626	·89174	89684	90161	90596
55	82736	83834	84802	85664	86441	87150	87796	88393	88945	89458	89933	90367
60	82500	83599	84568	85430	86208	86918	87569	88169	88720	89232	89707	90144
65	82262	83362	84334	85193	85976	86686	87337	87938	88490	89006	89479	89920
70	82023	83124	84092	84951	85736	86451	87105	87705	88254	88773	89252	89695
75	81780	82878	83851	84710	85496	86212	86864	87466	88018	88538	89018	89464
80	81530	82631	83603	84467	85248	85966	86622	87228	87776	88301	88781	89225
85	81291	82396	83371	84243	85036	85757	86411	87021	87590	88120	88605	89043
90	81044	82150	83126	84001	84797	85518	86172	86787	87360	87889	88376	88817
95	80794	81900	82877	83753	84550	85272	85928	86542	87114	87654	88146	88588
100	80548	81657	82639	83513	84308	85031	85688	86302	86879	87421	87915	88357

Haet.	100 alcohol 60 water.	100 alcohol 65 water.	100 alcohol 70 water.	100 alcohol 75 water.	100 alcohol 80 water.	100 alcohol 85 water.	100 alcohol 90 water.	100 alcohol 95 water.	100 alcohol 100 water.	95 alcohol 100 water.	90 alcohol 100 water.	85 alcohol 100 water.
30°	·91847	·92217	·92563	·92889	·93191	·93474	·93741	·93991	·94222	·94447	·94675	·94920
35	91640	92009	92355	92680	92986	93274	93541	93790	94025	94249	94484	94734
40	91428	91799	92151	92476	92783	93072	93341	93592	93827	94058	94295	94547
45	91211	91584	91937	92264	92570	92859	93131	93382	93621	93860	94096	94348
50	90997	91370	91723	92051	92358	92647	92919	93177	93419	93658	93897	94149
55	90768	91144	91502	91837	92145	92436	92707	92964	93208	93452	93696	93948
60	90549	90927	91287	91622	91933	92225	92499	92758	93002	93247	93493	93749
65	90328	90707	91066	91400	91715	92010	92283	92546	92794	93040	93285	93546
70	90104	90484	90847	91181	91493	91793	92069	92333	92580	92828	93076	93337
75	89872	90252	90617	90952	91270	91569	91849	92111	92364	92613	92865	93132
80	89639	90021	90385	90723	91046	91340	91622	91891	92142	92393	92646	92917
85	89460	89843	90209	90558	90882	91186	91465	91729	91969			
90	89230	89617	89988	90342	90668	90967	91248	91511	91751			
95	89003	89390	89763	90119	90443	90747	91029	91290	91531			
100	88769	89158	89536	89889	90215	90522	90805	91066	91310			

(1111.) The hydrometer authoriſed by government for aſcertaining the ſtrength of ſpirits, conſiſts of a thin ball, which has a ſolid button below to keep it ſteady, and a ſmall ſtem above on which weights are placed to make it ſink. Without the weights it ſwims in pure alcohol; and the temperature being taken by a thermometer, and weights added to adjuſt it to the temperature, a weight marked *proof* ſinks it until the ſurface of the liquor ſtands oppoſite to a mark in the middle of the ſtem. There is an ideal ſtrength of *ſpirit* called *proof*, to which the calculation is adjuſted, derived from an old way of judging of the ſtrength of ſpirits by their carrying air-bubbles on the ſurface when poured into a glaſs. If the ſpirits be ſtronger than this medium ſtrength, they
are ſaid to be *over proof*, and if weaker, they
ſaid to be *under proof*. If it requires one g
of water to be added to 10 of ſpirits to re
them to the proof ſtrength, they are ſaid t
one to ten *over proof;* and if it requires a g
of water to be abſtracted from every ten gal
of the ſpirits, to raiſe them to this proof ſtren
they are ſaid to be one to ten *under proof:* ar
of every other proportion. Theſe inſtruments
ſo aukward, that thoſe in one place do not
reſpond with thoſe of another, which is pro
tive of much diſpute between the dealers an
ficers of exciſe. Hence ſome have thought
the duties ought to be charged, and ſpirits ſol
the weight, and not by the bulk; or by
weight corrected by the ſpecific gravity.

(11

(1112.) Alcohol is not altered by air or oxygen gas at a moderate temperature, but when kindled it burns in them with great violence, and leaves no reciduum. Boerhaave firſt obſerved that the condenſed vapour of burning alcohol conſiſted of water; and Dr Black aſcertained that the weight of this water exceeded that of the alcohol conſumed. Lavoiſier found that the weight of the water exceeded that of the alcohol, by about $\frac{1}{7}$th part; from which he inferred that hydrogen formed a conſiderable conſtituent of alcohol. Dr Ingenhouſz firſt obſerved, that if the vapour of alcohol be mixed with a due proportion of oxygen gas, and fixed by a lighted taper, or by the electric ſpark, it detonates with violence, and the products are water and carbonic acid.

(1113.) When aſſiſted by heat, alcohol diſſolves a little phoſphorus; and when this ſolution is dropped into a glaſs of water, in the dark, a beautiful jet of flame riſes above the ſurface, which is owing to ſulphureted hydrogen gas eſcaping from the water. Alcohol hardly combines with ſulphur except when the two bodies are mixed into a ſtate of vapour. This is done by placing a phial containing alcohol in the bottom of a large glaſs cucurbite ſurrounded by flowers of ſulphur. A head being adjuſted, and the heat of a ſand-bath applied, both bodies riſe in vapour at once, and form a red liquor in the head of the cucurbite. Water precipitates the ſulphur from this combination. Very ſtrong alcohol diſſolves a little ſulphur if digeſted upon its flowers ſome time, eſpecially if aſſiſted by heat; and the quantity diſſolved is in proportion to the ſtrength of the alcohol.

(1114.) Alcohol diſſolves the fixed alkalies very readily, forming an acrid reddiſh coloured liquor, which was formerly called *the acrid tincture of tartar*. This liquor may be diſtilled over, though it is partly decompoſed during the proceſs. It is only by ſolution in alcohol that theſe alkalis can be obtained in a ſtate of purity. Ammonia, or vol-alkali, alſo diſſolves in alcohol, with the aſſiſtance of a moderate heat; but a greater heat expels the alkali in the form of gas, with ſome of the alcohol in union with it.

(1115.) Of the earths, alcohol only acts on ſtrontian and barytes. It abſorbs its own weight of nitrous gas. The ſulphuric, nitric, and oxymuriatic acids decompoſe alcohol. It diſſolves all the other acids except the metallic, phoſphoric, and pruſſic acids.

(1116.) Alcohol diſſolves a great variety of ſaline ſubſtances, and hence proves a valuable inſtrument in the hands of the chemiſt, not only for obtaining the alkalis in a ſtate of purity but for ſeparating ſalts from each other, and from other bodies, with a view to inveſtigate their properties. For this purpoſe Tables have been conſtructed, exhibiting the proportions of the ſeveral ſalts that are ſoluble in alcohol, with the temperature at which the ſolution takes place; and alſo the ſalts that are not ſoluble at any temperature. Such tables are highly uſeful for aſſiſting the inveſtigations of the chemiſt, and the following is the reſult of the joint labours of Macquer and Wenzel.

I. *Subſtances diſſolved in large Quantities.*

Names of the Subſtances.	Temperature.	240 parts of alcohol diſſolve
Oxyſulphat of iron . . .		
Nitrate of cobalt	54·5°	240 parts
copper	54·5	240
alumina	54·5	240
lime		300
magneſia . . .	180·5	694
Muriate of zinc	54·5	240
alumina	54·5	240
magneſia . . .	180·5	1313
iron	180·5	240
copper	180·5	240
Acetite of lead	154·5	240
copper		
Nitrate of zinc decompoſed		
iron decompoſed		
biſmuth decompoſed		

II. *Subſtances diſſolved in ſmall Quantities.*

Names of the Subſtances.	240 parts of alcohol at the boiling temperature diſſolve
Muriate of lime	240 parts
Nitrate of ammonia . . .	214
Oxy-muriate of mercury .	212
Succinic acid	177
Acetite of ſoda	112
Nitrate of ſilver	100
Refined ſugar	59
Boracic acid	48
Nitrate of ſoda	23
Acetite of copper . . .	18
Muriate of ammonia . . .	17
Superarſeniat of potaſh .	9
Oxalate of potaſh . . .	7
Nitrate of potaſh	5
Muriate of potaſh . . .	5
Arſeniate of ſoda	4
White oxide of arſenic . .	3
Tartrite of potaſh . . .	1
Nitrate of lead	
Carbonate of ammonia . .	

III. *Subſtances inſoluble in Alcohol.*

Sugar of milk,
Borax,
Tartar,
Alum,
Sulphat of ammonia,
lime,
barytes,
iron,
copper,
ſilver,
mercury,
zinc,

Sulphat of potaſh,
ſoda,
magneſia,
Sulphite of ſoda,
Tartrite of ſoda and potaſh,
Nitrat of mercury,
Muriat of lead,
ſilver,
Common ſalt,
Carbonat of potaſh
ſoda.

(1117.) As the ſolubility of ſalts depends upon the ſtrength of the alcohol employed, and Macquer and Wenzel, confined their experiments to alcohol of the ſpecific gravity of 0·840, we are indebted to the ingenious labours of Mr Kirwan for the following Table, which exhibits the ſolubility of various ſalts in alcohol of different ſpecific gravities.

Solubility of Salts in 100 parts of Alcohol of different Denſities.

Salts.	Alcohol of				
	0·900	0·872	0·848	0·834	0·817
Sulphate of ſoda	0·	0	0·	0·	0·
Sulph. of magneſia	1·	1·	0·	0·	0·
Nitrate of potaſh.	2·76	1·		0·	0·
Nitrate of ſoda	10·5	6·		0·38	0.
Muriate of potaſh	4·62	1·66		0·38	0·
Muriate of ſoda	5·8	3·67		0·5	
Muriate of ammon.	6·5	4·75		1·5	
Muriate of magneſia dried at 120°	21·25		23·75	36·25	50
Muriate of barytes Ditto cryſtallized	1· 1·56		0.29 0·43	0·135 0·32	0·09 0·06
Acetate of lime	2·4		4·12	4·75	4·88

(1118.) When the ſolutions of ſalts in alcohol are ſet on fire, the flame varies in colour according to the ſalt: and this property might be improved into a teſt of the genus of ſalt held in ſolution. Thus the flame from ſolution of nitrate of ſtrontian is purple; that from the cupreous ſalts is green; that from muriate of lime is of a red colour, &c

(1119.) Various opinions were entertained concerning the compoſition of alcohol, ſome ſuppoſing it to be phlogiſton combined with water by means of an acid, and others that it was phlogiſton combined with water alone. Lavoiſier endeavoured to ſolve this problem by burning alcohol in a lamp, in a cloſe veſſel over mercury, to which was introduced through a pipe, a regulated quantity of oxygen gas, to ſupport the combuſtion. The products were carbonic acid gas and water, the amount of which being aſcertained, and compared with that of the alcohol and oxygen gas conſumed, he calculated that 76·7083 grains of alcohol conſumed, were compoſed of

22·840	carbon,
6·030	hydrogen,
47·830	water.
76·700	

(1120.) Lavoiſier acknowledges ſeveral ſources of error in his experiments. Fourcroy and Vauquelin aſcertained that alcohol alſo contained a portion of oxygen, for when mixed with ſulphuric acid a portion of water was formed, without abſtracting any oxygen from the acid. From theſe and other data, Dr Thomſon calculates that 100 parts of alcohol contain

49	oxygen,
34	carbon,
17	hydrogen.
100	

The analyſis of alcohol is far from being ſo correct as that of water, nor has this analyſis been confirmed by ſyntheſis, or the reunion of its conſtituent parts.

(1121.) When paſſed in vapour through a red hot porcelain tube, alcohol is entirely decompoſed. Carbureted hydrogen and carbonic acid gaſes are formed; water paſſes into the receiver, with a concrete volatile oil which forms brilliant cryſtals upon its interior ſurface, and the inſide of the tube is coated with charcoal of a fine black colour.

Sect. II. Ether.

(1122.) This liquid is alcohol decompoſed, and converted into a volatile fragrant ſubſtance by the action of acids, aſſiſted by heat. The properties of ether are ſomewhat different according to the acid employed in its preparation, and it is hence diſtinguiſhed into *ſulphuric ether*, *nitric ether*, *muriatic ether*, &c.

I. Sulphuric Ether.

(1123.) Sulphuric ether is thus prepared. Equal parts of alcohol and ſulphuric acid are mixed and put into a retort, to which a large receiver is luted, and ſurrounded with ice, or the coldeſt water that can be procured. A gradual heat is applied to the retort, and when the mixture boils, ether comes over and trickles down the ſides of the receiver. When the product is equal to the half of the alcohol employed, the proceſs muſt be ſtopped.

(1124.) This ether contains a portion of ſulphurous acid, which may be ſeparated by diſtilling it a ſecond time, with a very moderate heat, from a little potaſh. Mr Dizé recommends as a more perfect purification, digeſting, and afterwards diſtilling it, from black oxide of mangaueſe in powder. The ſulphurous is converted into the ſulphuric acid, and combines with the mangaueſe, and the ether ſhould be diſtilled by the heat of a water-bath. Another proceſs, and which is reckoned the beſt, was employed by Mr Wolfe. A bottle being three fourths filled with the impure ether, and a little water and ſlacked lime added, is violently agitated, and kept ſome time in water before taking out the cork. If ſtill the ſmell of the acid remain, more lime muſt be added, and the bottle agitated as before. The acid combines with the lime; and the mixture being allowed to ſettle, the ether is drawn off by a ſyphon, and diſtilled by a very gentle heat as before. This is called the *rectification of ether*.

(1125.) This ether ſtill contains a portion of alcohol in its compoſition, and is ſeldom lighter than 0·775. Mr Lowitz ſeparated a great part of the alcohol by throwing in dry powdered ſalt of tartar, or dry powdered muriate of lime, in ſmall portions, as long as the alcohol continued to diſſolve theſe ſalts. The alcohol formed a liquid ſolution at bottom, while the ether ſwam at top. Its ſpecific gravity was now only 0·746, after being treated with the ſalt of tartar, and 0·632 with the muriate of lime, at the temperature of 60°. This ether contained a ſmall portion of the ſalts that had been mixed with it, from which it might be ſeparated by diſtillation; but this cauſes much of it to aſſume the gaſeous form. The common method of ſeparating the alcohol from rectified ether, is by mixing, and afterwards diſtilling it from water, which is not ſo effectual as the proceſs of Mr Lowitz.

(1126.) Ether thus obtained is a light colourleſs liquid, of a very fragrant ſmell, and a hot pungent taſte. It is ſo volatile that it cannot be poured from one veſſel to another without a conſiderable portion being evaporated. When poured on a table it quickly evaporates, and ſo much cold is generated by the evaporation, that if a phial filled with water, be covered with a cloth, and dipped twice or thrice in ether, and expoſed to the air, the water will be frozen. Ether boils at 98° in the open air, and at 20° below 0 in *vacuo*. Hence were it not for the preſſure of the atmoſphere, this ſubſtance would always exiſt in the form of a gas. It ſpeedily aſſumes the gaſeous form in the open air. When expoſed to a cold of —46°, it freezes and cryſtallizes.

(1127.) Ether is a highly inflammable ſubſtance, and when kindled in contact with oxygen gas, or common air, it rapidly burns with a fine white flame, leaving behind ſome traces of charcoal, and of ſulphuric acid. During combuſtion, carbonic acid gas is generated.

(1128.) Dr Prieſtley obſerved that if ether be thrown in among any gaſeous body, ſtanding over mercury, it always doubles the bulk of the gas. If oxygen gas be expanded by ether, and kindled, it burns ſlowly, but without exploſion. But Mr Cruickſhanks obſerved, that if one part in bulk of this mixed gas be added to three parts of pure oxygen gas, and kindled by a taper, or the electric ſpark, a very loud exploſion takes place, and the products are water, and 2½ parts of carbonic acid. He aſcertained that one part of the vapour of ether requires 6·8 parts of oxygen gas to conſume it completely, and from the relative proportions of the products he infers that the carbon contained in ether is to its hydrogen as five to one.

(1129. Dr Ingenhouſz diſcovered that if one drop of ether be thrown into a bottle, for every 10 inches of air it contains, it detonates on applying a lighted taper. The ſame method ſucceeds with oxygen gas; but when too much ether is added, it burns ſlowly without detonation.

(1130.) When the vapour of ether is paſſed through a red hot porcelain tube, it is wholly decompoſed, and a great quantity of carbureted hydrogen gas is produced.

(1131.) Ten parts of water only take up one part of ether, but this fluid combines with alcohol in all proportions. Ether diſſolves a ſmall proportion of phoſphorus, but the addition of a little alcohol renders it milky; and by this we may diſcover whether ether be adulterated with alcohol. Twelve parts of ether diſſolve one of ſulphur, when long digeſted on flowers of ſulphur in a cold ſtate. The ſolution is colourleſs, and has the taſte and ſmell of ſulphureted hydrogen. Ether alſo combines with ſulphur when they are brought to act upon each other in the ſtate of vapour. Upon the other ſimple combuſtibles it is not known to act.

(1132.) Ether does not act upon metals, but it revives gold and ſilver when dropped into their ſolutions. It diſſolves muriate of gold, and the oxy-muriate of mercury. It abſorbs nitrous gas in great quantity.

(1133.) Sulphuric acid converts ether into a peculiar oil, called the *ſweet oil of wine*, and this oil is alſo formed during the proceſs by which ether is made, and comes over if the diſtillation be continued. If a ſmall quantity of ether, or a paper dipped in ether, be introduced into a bottle filled with oxy-muriatic acid gas, from which water has been abſtracted, it firſt produces a white vapour, and then explodes and inflames ſpontaneouſly. A conſiderable quantity of charcoal is depoſited, and carbonic acid gas is formed. The action of the other acids upon ether has not been minutely examined.

(1134.) Ether diſſolves the fixed and volatile oils, reſins, and the fluid bitumens; but it does not act upon gums.

(1135.) Much difference of opinion has been entertained reſpecting the compoſition of ether. Macquer ſuppoſed it to be alcohol which the ſulphuric acid had deprived of all its water. Scheele ſuppoſed it to be alcohol deprived of part of its phlogiſton. Pelletier concluded from his experiments, that it is alcohol combined with oxygen. Dabit ſuppoſed ether to contain a greater proportion of oxygen and carbon, and a ſmaller proportion of hydrogen, than alcohol. The experiments of Fourcroy and Vauquelin tend to ſubvert the opinions of other chemiſts, without eſtabliſhing any ſatisfactory ſolution of the problem in their place.

(1136.) They remarked three periods in the action of ſulphuric acid upon alcohol. Firſt, when a ſmall quantity of ether and water are formed without the aſſiſtance of heat. The ſecond, when all the ether which can be obtained is diſengaged by the aſſiſtance of heat, without the accompaniment of ſulphurous acid. The third, when the ſweet oil of wine, olefiant gas, acetous acid, ſulphurous acid, and carbonic acid, are afforded. The olefiant gas has been deſcribed (612, &c.) and they obſerved that the formation of water is common to all theſe ſtages. They hence inferred, that alcohol was decompoſed during this proceſs, in the ſame way as if it had been paſſed through an ignited tube. Ether they ſuppoſed to be alcohol from which part of its oxygen and hydrogen had been abſtracted, and formed into water. The ſweet oil and olefiant gas to be a continuation of this proceſs, and not to differ from the ether except in containing a greater proportion of carbon. The ſulphurous and carbonic acids they ſuppoſed to ariſe from the decompoſition of part of the ſulphuric acid, by means of carbon, towards the concluſion of the proceſs. This ſubject ſtill requires much additional inveſtigation.

II. Nitric

II. Nitric Ether.

(1137.) Nitric ether was firſt diſcovered by Kunkel in 1681; afterwards by Navier in 1742; and by Sebaſtiani in 1746.

(1138.) It was firſt prepared as follows:—Into a ſtrong bottle, immerſed in cold water or ice, twelve parts of alcohol are put, and eight parts of nitric acid are poured in at intervals, in ſmall quantities at a time, and the bottle ſhaken at each addition of the acid. The bottle is well corked, and the cork ſecured by leather. After five or ſix days, ether is formed, which floats on the ſurface of the liquor. The cork muſt firſt be pierced with a needle, to allow a quantity of nitrous gas to eſcape; after which it may be pulled out, and the ether drawn off from the ſurface by a glaſs ſyphon.

(1139.) As the bottle is very apt to burſt, by the quantity of nitrous gas generated during this proceſs, Dr Black adopted a very ingenious method of preventing this. Having put the proper quantity of acid in a bottle, he gently poured upon its ſurface a quantity of water, and upon the water the proper proportion of alcohol, without agitation or mixture. Thus he had a ſtratum of water interpoſed between the ſtratum of acid and alcohol, with which each combining ſlowly, they met and acted upon each other without violence, and thus formed ether.

(1140.) The moſt expeditious method of obtaining nitric ether is that which was propoſed by Chaptal, and improved by Prouſt:—A mixture of 32 parts of alcohol, and 24 of nitric acid of ſpecific gravity 1·3, is put into a retort. A large globular glaſs retort is luted to the receiver, furniſhed with a tube of ſafety. A tube connects this with a ſecond veſſel, which is alſo furniſhed with a tube of ſafety. Three of Wolfe's bottles, half full of alcohol, are connected by tubes with this ſecond veſſel. The apparatus being thus diſpoſed, heat is applied in a chaffing diſh to the retort, and removed as ſoon as the efferveſcence commences. The undecompoſed acid which paſſes over is condenſed in the two receivers, and the ether combines with the alcohol in Wolfe's bottles, and chiefly in the firſt; while the tubes of ſafety prevent the nitrous gas from burſting the veſſels.—To ſeparate the ether from the alcohol, ſaturate the latter with pure potaſh, and diſtil with a gentle heat.

(1141.) The nitrous ether, thus obtained, contains a conſiderable portion of nitrous gas, and is hence very volatile. It contains alſo ſome nitric acid and oil, to which it owes its yellow colour. Mixing it with water ſeparates the nitrous gas; and the oil may be abſtracted by repeated diſtillation from potaſh or ſugar. When kept ſome time, the nitric acid is decompoſed, forming water and oxalic acid, which go to the bottom.

(1142.) Nitric ether is heavier than ſulphuric ether, its ſpecific gravity being 0·9000. Its taſte and odour are nearly the ſame, though not juſt ſo pleaſant, owing probably to an admixture of foreign matter from which the means have not been diſcovered of ſeparating it.

(1143.) In the formation of nitric ether, the acid is decompoſed, which is not the caſe while ſulphuric ether is formed. The mode by which nitric ether is formed has not attracted ſo much attention as that of the ſulphuric; but perhaps we may obtain ſome notion of it by attending to the following proceſſes.

Etherised Nitrous Gas.

(1144.) If equal parts of alcohol and nitric acid be mixed, a violent efferveſcence enſues, or, if the acid be weak, when heat is applied. Much gas eſcapes, which may be collected in a veſſel over water, and is a compound of nitrous gas and ether.

(1145.) This gas has a diſagreeable odour, mixed with that of ether. It is abſorbed by water, alcohol, and ſolution of potaſh; burns with a yellow flame, and detonates when fired along with oxygen gas. It is decompoſed by the ſulphuric, ſulphurous, nitric, and muriatic acids, which combine with the ether, and leave the nitrous gas unchanged. The reſiduum, after this gas is extricated, conſiſts chiefly of acetic acid.

(1146.) A mixture of one part alcohol, and three parts nitric acid, of the ſpecific gravity 1·261, efferveſces and emits the ſame etheriſed nitrous gas. When the reſiduum, after the gas is extricated, is allowed to cool, it depoſits cryſtals of oxalic acid.

(1147.) When one meaſure of nitric acid is poured upon its own weight of alcohol, and the ſame meaſure of ſulphuric acid is added ſoon after, the mixture takes fire, and burns with great violence. In this caſe if the products be collected, they are found to be ether and oil, which paſs over when performed in a retort, or other cloſe veſſel.

Fulminating Mercury.

(1148.) Diſſolve 100 grains of mercury in a meaſured ounce and a half of nitric acid of ſpecific gravity about 1·3, with the aſſiſtance of heat. Pour this ſolution upon two meaſured ounces of alcohol, applying heat until the mixture begins to efferveſce, and then remove it. A violent efferveſcence takes place, and denſe white clouds iſſue from the veſſel, which being heavier than the air may be received into glaſs jars. Mr Howard, to whom we are indebted for this diſcovery, thinks this cloudy vapour conſiſts of etheriſed nitrous gas, which holds in ſolution oxide of mercury. Meanwhile the mixture depoſits a white powder, which, when the efferveſcence ceaſes, ſhould be thrown upon a filter, waſhed with pure water, and dried by a heat not exceeding 212°.

(1149.) When heated to 368°, this powder explodes with great violence. It likewiſe explodes by friction, by the blow of a hammer, by electricity, and by ſparks from a flint. The products of its combuſtion are carbonic acid gas, water, and mercury. Concentrated ſulphuric acid explodes it; but in diluted ſulphuric acid it decompoſes without exploſion. When this mixture is diſtilled, it yields the ſame ſort of gas which is formed when diluted ſulphuric acid acts upon etheriſed nitrous gas, which burns with a greeniſh flame. The reſiduum is ſulphuric acid, oxalate of mercury, and a few globules of revived mercury.

(1150.) Mr Howard, having prepared this powder with a low heat, has ſhewn that it conſiſts of oxalate of mercury, and etheriſed nitrous gas. But Fourcroy has ſhewn that when the heat is continued during the whole efferveſcence, it conſiſts of ammonia, oxide of mercury, and a peculiar vegetable matter. Its colour is then greeniſh, and it detonates feebly with a blue flame. When the mixture is boiled half an hour, it conſiſts of oxalate of mercury and a ſmall quantity of vegetable matter, and it then decrepitates, but does not detonate when heated.

(1151.) Theſe great variations in the reſult, from an apparently ſlight variation in the mode by which nitric acid is made to act upon alcohol, increaſe the difficulty of accounting for the production of ether from the mixture of theſe liquids. But it would ſeem that the more the acid acts upon the alcohol without being decompoſed, the greater the quantity of ether is formed from a given quantity of alcohol. Even when the acid is decompoſed by the alcohol, part of the latter is converted into ether, which combines with the nitrous gas, and aſſumes the gaſeous form. The formation of ether, in this caſe, ſeems therefore perfectly analogous to its formation by ſulphuric acid.

III. MURIATIC ETHER.

(1152.) Muriatic ether may be made from the oxy-muriates of mercury, iron, arſenic, and antimony; but the ſalt which anſwers beſt is the oxy-muriate of tin. Courtanvaux firſt formed ether from this ſalt in 1759. Three parts of fuming oxy-muriate of tin, and one part of alcohol are mixed together; and, after the heat and efferveſcence have ceaſed, the mixture is put into a retort to which two large receivers are luted, and immerſed in the coldeſt water that can be got, or in ice, on applying a moderate heat, there firſt comes over a little alcohol, then ether.

The liquid muriatic acid contains too much water to act upon alcohol ſo as to form ether. But ether may be formed by cauſing the acid in its gaſeous form, when as much diveſted of water, as poſſible, to act upon alcohol. For this purpoſe common ſalt ſhould be kept at leaſt an hour in a ſtate of fuſion, in order to expel its water of cryſtallization. Having put 20 parts of this dried ſalt into a tubulated retort, which is connected by a bent tube, with a Wolfe's bottle containing 10 parts of the ſtrongeſt alcohol, pour through the tube of the retort 10 parts of the moſt concentrated ſulphuric acid. Having allowed the air in the veſſels to eſcape, diſtill over the muriatic acid gas by the heat of a ſand bath, while the Wolfe's bottle is kept as cool as poſſible. The muriatic acid paſſes over, and incorporates with the alcohol in the bottle. This product being put into a retort, ſhould be diſtilled over to about one half. The product thus obtained is ether mixed with alcohol, which being ſaturated and agitated with an alkaline ley, the ether, which is uſually 2½ parts, floats on the ſurface, and may be drawn off by a ſyphon.

(1153.) Muriatic ether only differs from the ſulphuric, in exhaling an acrid odour, ſimilar to that of ſulphurous acid, when burnt; and in having an aſtringent taſte like alum. Its ſpecific gravity is about ·719. We have often concluded, from the aromatic ſmell, that ether is formed when the fumes of nitric, or of muriatic acid, come in contact with thoſe of alcohol, from bottles of theſe liquids placed beſide each other in a box. There is therefore ſome degree of probability that the readieſt way of forming theſe ethers would be by cauſing the ſubſtances to act upon each other in a ſtate of vapour.

IV. ACETIC ETHER.

(1154.) Count de Lauraguais, in 1759, diſcovered that ether may be formed by the action of acetic acid on alcohol. For this purpoſe equal quantities of alcohol, and of acetic acid from acetite of copper, are mixed and diſtilled. The alcohol comes over, and it muſt be poured back, and diſtilled a ſecond and third time. The product of this third diſtillation is a mixture of acetic acid and ether. The acid being ſaturated with potaſh, and the compound again diſtilled with a moderate heat, the ether comes over pure.

(1155.) Bucholz obtained this ether by putting into a retort 16 parts of dry acetate of lead, 6 parts of ſtrong ſulphuric acid, and 9 parts of alcohol. Ten parts being diſtilled over, the product was agitated with a third of its bulk of lime water. This cauſed the ether to riſe to the ſurface where it could be drawn off.

(1156.) Scheele obtained acetic ether by diſſolving one part of dry acetate of potaſh in three parts of alcohol, adding more ſulphuric acid than was neceſſary to ſaturate the potaſh, and then diſtilling.

(1157.) Acetic ether exhales a perceptible ſmell of the acetic acid, and probably differs only from the ſulphuric ether in containing a portion of acetic acid in its compoſition.

(1158.) Ether may be obtained by the action of moſt of the other acids upon alcohol; and there are only about nine acids from whoſe action it has not been obtained by any proceſs that has yet been tried. The general opinion among chemiſts, is, that there is only one ether, and that the differences between ethers obtained by different acids, are to be aſcribed to extraneous bodies with which they are mixed.

SECT. III. FIXED OILS.

(1159.) Oils abound much in nature, and are of very extenſive uſe in domeſtic economy, and in arts and manufactures. They were known at a very early period, are mentioned in the Book of Geneſis, and in Abraham's time were uſed even in lamps. Cecrops is ſaid firſt to have introduced the cultivation of the olive into Attica, and to have made the Europeans acquainted with the uſe of oil. Homer's heroes uſed burning ſticks inſtead of lamps.

(1160.) Oils are diſtinguiſhed into the *fixed* or *fat*, and the *volatile* or *eſſential* oils. The fixed oils require a higher temperature than that of boiling water to raiſe them in vapour. The volatile oils riſe in vapour at a lower temperature than that of boiling water.

(1161.) Fixed oils are highly inflammable; are liquid, or become ſo by a gentle heat; their boiling point not under 600°; have a mild taſte; a greaſy feel; and leave a ſtain.

(1162.) They are alſo called *expreſſed oils*, becauſe they are obtained by compreſſion from a great variety of vegetable, and ſome animal ſubſtances. Theſe oils are found chiefly in the ſeeds of vegetables; and Fourcroy remarks they are found only in the ſeeds of the *bicotyledinous* claſs of plants. The ſeeds of plants from which they are chiefly extracted are the fruit of the olive, the kernels of almonds, and of a great variety of ſtone fruits; from linſeed, rape-ſeed, hemp-ſeed, poppy ſeed, and a variety of other ſeeds, from which they are extracted by powerful mechanical compreſſion. Fixed oils may alſo be extracted from beech-maſt, and various ſeeds of trees. Fixed oils are alſo obtained from animals, thus whale, or train oil is obtained from the blubber of the whale. In other animals the liver chiefly yields the fixed oils. Thus they are extracted from the liver of the ſail-fiſh, of the dog-fiſh, of the cod, and various others. In the human and other animal bodies, every moving joint is furniſhed with a gland which ſecretes a fixed oil, to lubricate the part, and avert the dreadful conſequences which would ariſe from friction.

(1163.) The fixed oils are very numerous, and they have all ſome ſhades of difference from each other. Although we are not ſufficiently acquainted with their nature to decide poſitively, it ſeems extremely probable that the oil is the ſame in all, and that their differences are occaſioned by extraneous matters in the compoſition of each ſpecies. It would be of no uſe to enter into a deſcription of each individual of this claſs of bodies, and we ſhall confine ourſelves to thoſe properties which are common to all, and which are much more conſpicuous than the particulars in which they differ.

(1164.) All the fixed oils are inſoluble in water. They are alſo lighter, and hence always float on the ſurface of that liquid. They are never perfectly limpid, but always poſſeſs ſome degree of colour. Nor are they perfectly fluid, but poſſeſs a degree of tenacity, and adhere to the ſides of the veſſel in which they are contained. They all require a higher temperature than water to make them boil, and the boiling point often varies in different ſpecimens of the ſame oil.

(1165.) When diſtilled theſe oils are partially decompoſed. Some acetic acid and water are formed, and a little charcoal remains in the retort, while much carbureted hydrogen gas is evolved. The oil becomes lighter, more fluid, and has a ſtronger taſte than before. Diſtilled oil was formerly dignified by the name of *philoſophical oil*.

(1166.) When kindled in a ſtate of vapour, fixed oil burns with a yellowiſh white flame. The uſe of a wick for a candle or lamp, is to preſent a ſufficiently ſmall quantity, and in regular ſucceſſion, of the oil to the action of heat, that it may be converted into vapour; and the flame forms a cone, the interior of which is filled with this vapour, which only takes fire where it comes in contact with the oxygen gas of the atmoſphere. If the whole oil be raiſed to 600°, it takes fire ſpontaneouſly. When ſufficiently cooled, the fixed oils are converted into ice; but the freezing point is various in different oils.

(1167.) When expoſed to the air, or to oxygen gas, they gradually combine with it, and become more and more viſcid, until at laſt they are changed into a ſolid ſubſtance. Some retain their tranſparency after this change, and are called *drying oils*; others become opaque, like wax or tallow and are called *fat oils*.

(1168.) The linſeed, nut, poppy, and hempſeed oils, are the principal drying oils commonly uſed, and they are employed in the preparation of paints and varniſhes. To qualify them for theſe purpoſes, they are always boiled ſome time in an iron pot, during which proceſs they are partially decompoſed, and much watery vapour, and carbureted hydrogen gas is emitted from them. Their colour becomes deeper, and their conſiſtency greater. During the boiling a little litharge is commonly mixed with them. For certain purpoſes they are ſet on fire during the boiling, and after burning ſome time, they are extinguiſhed by placing a lid over the pot; after which the boiling is continued until they acquire the proper viſcidity. By theſe means theſe oils loſe their unctuoſity, and approach the nature of reſins. But they do not become brittle, for they ſtill retain a conſiderable degree of toughneſs and ductility. Burning them ſome time is the moſt effectual method for deſtroying their unctuoſity.

(1169.) Nut oil is found to be the beſt for printer's ink, and next to it lintſeed oil. The oil is put into a pot only half full, burnt for about half an hour or more, and boiled to the proper conſiſtency. It is then called *varniſh*; and two kinds, a thicker and a thinner are prepared; the latter to be mixed with the former ſhould its conſiſtency be found too great. The varniſh improves by keeping after it is prepared. It it ground with two ounces and a half of lamp black to every ſixteen ounces of oil. Sometimes the black is extended with Spaniſh whitening, and ſometimes receives a ſmall admixture of Spaniſh, or of Pruſſian blue. That the oil has undergone ſome change, by the boiling and burning, appears from printer's ink adhering to wet paper. But it is ſtill very different from a mucilage, becauſe it does not combine with water, nor does it ſpread or ſtain the contiguous paper.

(1170.) The *fat oils*, ſuch as the oil of olives, of ſweet almonds, of rape-ſeed, of ben, &c. by long expoſure to the air become white, thick, and opaque, ſo as to reſemble tallow. This happens much ſooner when they are poured upon water, ſo as to form a thin coating upon its ſurface. This does not happen when they are excluded from contact with oxygen gas; and hence it muſt be owing to the action, or more probably, the abſorption of this gas.

(1171.) The fixed oils, when aſſiſted by heat, readily diſſolve ſulphur, forming a reddiſh coloured ſolution, which yields much ſulphureted hydrogen gas by diſtillation. The ſolution depoſits the ſulphur in octahedral cryſtals by ſlow cooling. When boiled in water along with phoſphorus, theſe oils alſo diſſolve a ſmall proportion of the latter. The ſolution yields phoſphureted hydrogen gas by diſtillation, and appears luminous when ſpread on the ſurface of bodies.

(1172.) When the fixed oils are agitated in water, the mixture becomes milky, but the oily particles ſoon ſeparate and riſe to the ſurface. If gum-arabic, or any mucilage be preſent, the oil does not ſeparate, and the mixture becomes permanently milky. Such preparations are called *emulſions*, and they are commonly prepared by grinding oily ſeeds, ſuch as thoſe of almonds, in water, which contain both an oil and a mucilage to keep its particles ſeparate.

(1173.) The fixed oils, even after they have been boiled, are inſoluble in alcohol. But if they have been combined with an alkali, and afterwards ſeparated by an acid, they become ſoluble in alcohol; a proof they had undergone ſóme change. They are not ſoluble in ether; but combine readily with each other, with the volatile oils, and with bitumens and reſins.

(1174.) With alkalis they combine readily, and form the important compounds called *ſoaps*. The drying oils do not combine ſo readily with alkalis as the fat oils; and hence the former are never uſed in the making of ſoap. They combine with ſeveral of the earths, forming ſoaps which are inſoluble in water; and hence ſuch compounds cannot be uſed for waſhing, though ſome of them may be uſed as paints. With the metallic oxides, they alſo form inſoluble ſoaps, which are uſed as paints of various colours. The fixed oils diſſolve the white oxide of arſenic; and when boiled with the oxides of mercury, lead, or biſmuth, they form the tough compounds called plaſters, which are uſed as an artificial ſkin to exclude the air from wounds.

(1175.) Of the metals, the fixed oils are only known to act upon copper and mercury, with acceſs of atmoſpheric air. Copper they corrode, forming with it a dark green ſolution. When mercury is long rubbed and triturated with a fixed oil, eſpecially ſuch as approach to ſolidity, they incorporate. The metal is changed into its black oxide, and a greyiſh blue coloured unguent is formed called *mercurial ointment*, which is uſed for various purpoſes, and particularly for curing a certain diſeaſe.

(1176.) Phoſphoric acid deepens the colour of theſe oils, and ſulphuric acid firſt renders them black, afterwards converts them into bitumen, and at laſt decompoſes them entirely, if its action be continued a ſufficient length of time. The reſult is the formation of water, while charcoal is precipitated, and an acid evolved. But the action of this acid on theſe oils has not been ſufficiently examined.

(1177.) When nitric acid is ſuddenly poured upon the drying oils, it ſets them on fire. It alſo fires the fat oils if it be previouſly mixed with a ſmall portion of ſulphuric acid. When ſufficiently diluted with water, the nitric acid converts the drying oils into a yellow reſinous ſubſtance, and the fat oils into a ſubſtance like tallow.

(1178.) The diluted ſulphuric acid combines with oil, and forms a compound called *acid ſoap*. This lathers like the common ſoap; but as the combination is not permanent, no uſe has been made of it.

(1179.) When oils are long kept, they get *rancid*, becoming thick, of a brown colour, acrid taſte, and diſagreeable ſmell. When this happens, they change vegetable blues into a red, ſhewing that an acid has been formed in them. Mr Doſſie has ſhewn that agitation with ſolutions of the fixed alkalies, and with quicklime, purifies the rancid oils, and the fiſh oils, for burning in lamps. Part of the oil is coagulated, which may be prevented by adding a quantity of ſtrong brine.—They are alſo purified and rendered colourleſs, by being paſſed through charcoal powder.

(1180.) When theſe oils are burnt, the only products are carbonic acid and water. When repeatedly diſtilled, or when paſſed through a red hot tube, they are converted into water, carbonic acid, and carbureted hydrogen gas. Lavoiſier burnt olive oil in a veſſel filled with oxygen gas. During the combuſtion there was conſumed

Of oil,	15·79 grains troy,
Of oxygen gas,	50·86,
Total,	66·65.

The products were carbonic acid and water, of which the former amounted to 44·50 grains. The quantity of the water could not be accurately aſcertained, but it muſt have been equal to what the carbonic acid wanted of the original weight of the oxygen gas and the oil. Calculating therefore from the conſtituents of carbonic acid, (592) and water, (548) he inferred that 15·79 grains of oil are compoſed of

12·47 carbon,
3·32 hydrogen,

or that olive oil is compoſed of about

79 carbon,
21 hydrogen.

This can only be conſidered as an approximation towards the truth, and there is reaſon to believe that ſome, if not all of the oils, contain alſo oxygen as a conſtituent ingredient.

(1181.) The order of the affinities of the fixed oils follows:—

Lime,
Barytes,
Fixed alkalies,
Magneſia,
Ammonia,
Oxide of Mercury,
Other metallic oxides,
Alumina.

SECT. IV. VOLATILE OILS.

(1182.) THE *volutile oils* are ſo called from their volatility, as they always riſe in vapour at a lower temperature than 212, or the boiling point of water. They are alſo called *eſſential oils*, as they were ſuppoſed to contain the concentrated ſubſtance of the plant from which they were obtained. They are called *aromatic oils*, from the fragrant ſmell which they exhale.

(1183.) Beſide theſe properties, they are very combuſtible; nearly as liquid as water, though ſometimes viſcid; have an acrid taſte; are ſoluble in alcohol and imperfectly in water; after evapouration they leave no ſtain on paper. This laſt property enables us to judge whether they have been adulterated by a mixture of the fixed oils; for if a drop evapourates from paper without leaving a ſtain, they are pure, if not, they are adulterated.

(1184.) The volatile oils are almoſt all obtained from vegetables; though ſome few, ſuch as oil of muſk and others, are obtained from animals. They are obtained from all parts of plants, the root, the bark, the wood, the pith, the leaves, flowers, fruits, and ſeeds. But they are never found in thoſe ſeeds which yield fixed oils.

(1185.) They may often be obtained by ſimple expreſſion which is the caſe with oil of lemons, oranges, and bergamotte. But in general they are obtained by diſtilling the plants containing them, mixed with water, with a moderate heat. The oil comes over along with the water, and floats upon its ſurface. In this way the oil of lavender, peppermint, thyme, and various others, which are employed by the perfumer, are obtained. Oil of turpentine is obtained by diſtilling the juice called turpentine, which exudes from the juniper tree.

(1186.) Theſe oils are ſo numerous that a detailed deſcription of each would be a Herculean taſk. Some are as limpid as water, and have no oily appearance, as oil of turpentine, oranges, lemons, bergamotte, roſes. Some have a degree of viſcidity, as oil of mace, cardamum, ſaſſafras, cloves, cinnamon. Others gradually loſe their fluidity and become ſolid, as oil of parſley, fennel, aniſeed, balm. Others when ſlowly evapourated cryſtallize, as oil of thyme, peppermint, marjoram. Others ſoon acquire the conſiſtence of butter, as the oil of nutmegs, hops, and pepper. They are alſo of almoſt every colour; and ſome which are limpid at firſt, become brown by age. Their odours are alſo ſo various as to defy all deſcription. In fact all the fragrance of the vegetable kingdom is contained in the eſſential oils, and when theſe are extracted, plants have no ſmell whatever. A deſcription of their odours would therefore be a deſcription of the peculiar ſmell of each odoriferous plant. The ſpecific gravity of theſe oils is alſo conſiderably various, and it varies in the ſame oil at different periods of its age.

(1187.) The volatile oils evapourate readily when heated in the open air, and diffuſe their peculiar odour; but they do not evapourate ſo readily in cloſe veſſels, unleſs water be preſent. Without this, they are apt to be decompoſed, they loſe their odour, and become darker in the colour. When expoſed to cold, they freeze at different temperatures, according to the oil. Some at 17° are partially cryſtallized, and converted into other ſubſtances, one of which reſembles benzoic acid.

(1188.) When expoſed to light in cloſe veſſels, their colour becomes deeper, their conſiſtency and ſpecific gravity are increaſed, as well as their abſolute weight. Tingry thinks theſe effects are produced by the fixation of light. But as the degree of effect is always proportional to the quantity of oil, and of air included in the veſſel, it is more probably owing to the abſorption of oxygen.

(1189.) Dr Prieſtley aſcertained that theſe oils, by expoſure to the air, abſorb oxygen, and alſo abſorb it from the air in cloſe veſſels in which they are kept. He aſcertained that oil of turpentine imbibes a conſiderable quantity of air, which can be extricated from it by means of the air-pump. By long expoſure to air, the volatile oils loſe their ſmell, become thick and aſſume the appearance of reſins.

(1190.) Many of theſe oils, when dropped upon ſugar, which is afterwards diſſolved in water, convey to the water their peculiar taſte and ſmell. This ſolution is known by the name of *oleo-ſaccharum*. They diſſolve in alcohol, ether, and the fixed oils. Oil of turpentine diſſolves ſlowly in alcohol, and afterwards ſeparates from it.

(1191.) When digeſted upon ſulphur, at its melting temperature, they diſſolve a portion of it, acquire a brown colour, with a diſagreeable ſmell and taſte. Theſe ſolutions are called *balſams of ſulphur*, and a portion of the ſulphur cryſtallizes on ſlow cooling. When ſtrongly heated, theſe balſams emit ſuch quantities of gas, as to occaſion dangerous exploſions; and they ſhould be managed with much caution.

(1192.) With the aſſiſtance of heat, theſe oils diſſolve a portion of phoſphorus, though moſt of them part with it again on cooling. But if ten parts of camphor be rubbed and mixed with one part of phoſphorus, this mixture enters into permanent union with the eſſential oils, particularly the oil of cloves, and the ſolution poſſeſſes the property of being luminous without taking fire. When the face or hands are rubbed, or letters written with it, they appear luminous in the dark.--This is what Boyle uſed under the name of *liquid phoſphorus*.

(1193.) The eſſential oils ſcarcely combine with alkalies. The medicinal preparation called *Starkey's ſoap* is made by triturating oil of turpentine with potaſh, and the operation is ſo tedious and laborious, that there is reaſon to believe the oil is converted into reſin, by abſorbing oxygen from the atmoſphere before it combines with the alkali. With reſin, the alkalies combine very readily.

(1194.) The ſulphuric acid firſt diſſolves theſe oils, then converts them into reſin, and laſtly into charcoal. They may be ſeparated from the acid, in any of theſe ſtates, by pouring in water. An acid ſoap may be formed by ſlowly dropping, and repeatedly ſtirring, oil of turpentine in ſulphuric acid. The ſoap ſeparates from the maſs; is of the conſiſtence of ſoft wax; and ſoluble in water and alcohol. When this ſoap is decompoſed by an alkali, the oil is found to have been converted into a reſin, and afterwards unites with alkalies.

(1195.) When concentrated nitric acid, is poured ſuddenly upon any of the eſſential oils, it ſets them on fire; but if the acid be diluted with water, it diſſolves them, and converts them into reſins, of a yellow colour. Oxymuriatic acid acts in the ſame way.

(1196.) When theſe oils are burnt in the open air, they emit a clear bright flame, with much ſmoke. The ſmoke, being collected, is found to conſiſt of carbonic acid, water, and charcoal. From theſe facts, combined with the effects of acid ſupporters upon them, it is inferred that the volatile oils are compoſed of hydrogen and carbon, with various proportions of oxygen; though no exact analyſis of them has yet been attempted.

(1197.) The volatile oils are much uſed in medicine,

dicine, in painting, and perfumery Oil of turpentine is much uſed to diſſolve reſins, and the ſolutions are applied as varniſhes to various bodies. The oil of turpentine, uſed in this way, readily evapourates, leaving the reſin in contact with the body to which it is applied; or the oil is oxygenated and becomes a reſin itſelf; but the varniſh does not become brittle like the original reſin.

(1198.) There is another claſs of oils which has been diſtinguiſhed by the name of *empyreumatic oils*, which agree in ſome particulars with the volatile oils. They are formed when the other oils are diſtilled with a higher degree of heat than the boiling point of water, or by the application of high degrees of heat to moiſt animal and vegetable ſubſtances, which are not known to contain any oil. They are ſuppoſed to be the other oils changed, and partially decompoſed by heat. They have a ſtrongly fetid and diſagreable ſmell, an acrid and harſh taſte. They combine, in ſmall proportion, with water, and are ſoluble in alcohol. It is from theſe oils that ſpirits and other diſtilled liquids, derive what is called an *empyreumatic flavour*, which happens either when the ſtill is too large, and contains ſuch an incumbent maſs of liquid that the ſteam is compreſſed, and cannot freely riſe from its bottom; or when the neck and worm are too narrow to diſcharge the ſteam as faſt as it is generated. In ſuch caſes the heat accumulates conſiderably higher than the vapourific point, before it can be carried off by the ſteam; the ſtill is ſaid to be burnt, its bottom often giving way; and the ſpirits are impregnated with empyreumatic oil, formed by the accumulation of heat in the ſtill.

Sect. V. Bitumens.

(1199.) This name was formerly applied to all mineral inflammables, but is now reſtricted to ſubſtances which have a ſtriking reſemblance to vegetable oils and reſins. Indeed there are ſtrong reaſons for believing that, if not all, at leaſt this claſs of mineral inflammables, was originally derived from vegetables and animals.

(1200.) This claſs of bodies is ſubdivided into *mineral oils*, and *bitumens properly ſo called*. The mineral oils bear a moſt ſtriking reſemblance to the volatile oils which we have juſt been diſcuſſing, and ought to be claſſed with them. The bitumens are a more numerous claſs of bodies, and they ſeem to bear the ſame relation to the mineral oils, that reſins bear to the volatile oils.

(1201.) The only mineral oil whoſe properties have been examined, is uſually called *petroleum*, or *rock oil*; and ſometimes *coal oil*, as it is obtained from foſſil coal. It is very volatile, and diſtills without alteration; is uſually of a yellowiſh brown colour, though we have ſeen it rectified ſo as to be as limpid, and fluid as water. It has a very acrid taſte; and a diſagreeable ſmell. Its ſpecific gravity varies from 0·730 to 0·878. It combines with alcohol, ether, the volatile and fixed oils, and poſſeſſes all the properties of a volatile oil.

(1202.) In its pureſt form, petroleum is uſually called *naphtha*, in which ſtate it iſſues in great abundance from many fiſſures in the mineral ſtrata, along the ſhores of the Caſpian, and in Perſia. It alſo occurs in Germany, Italy, and various parts of Europe. It is often ſeen to form a white ſcum on the ſurface of water which iſſues from ſprings in this country, and ſometimes to ooze from fiſſures of rocks, where it may be collected in ſmall quantities. In this ſtate it is limpid and colourleſs, but becomes darker by expoſure to the air.

(1203.) Petroleum, and bitumen, were firſt extracted from coal in this country, by Lord Dundonald, by diſtillation from kilns conſtructed for the purpoſe. The product of the firſt diſtillation is a thin dark coloured liquid, conſiſting of petroleum combined with coal tar. By expoſure to the air, part of the petroleum evapourates, the liquid thickens, becomes blacker, and acquires the conſiſtence of tar, and even becomes ſolid if expoſed a ſufficient length of time. It would ſeem that oxygen is abſorbed, as well as volatile oil evapourated. But to inſpiſſate his tar, Lord Dundonald ſubjected it to a ſecond diſtillation, by which he ſeems to have expelled too much of the volatile oil, as his tar was rendered brittle like reſin, and was apt to crack and fall off from the ſides of ſhips on which it was laid. Perhaps it would have been better to have combined ſome fixed oil, or wood tar, with his inſpiſſated tar; or to have brought the tar of the firſt diſtillation to the proper conſiſtence by combining it with reſin.

(1204.) In the VI. Vol. of the Aſiatic Reſearches, 1·127, we have a very accurate deſcription, by Captain Hiram Cox, of a ſpecies of mineral oil, every way ſimilar to the product of Lord Dundonald's firſt diſtillation, which flows from numerous ſprings near Amarapoorah, the capital of the Burmha empire in India. They dig numerous pits for this oil, to the depth of about 200 feet, and it yields a conſiderable income to the proprietors, as well as revenue to the government It oozes from ſtrata of coal, and of dark bituminated clay, commonly called *blaës* in this country by the colliers. This oil is nearly as liquid as water when taken out; but by expoſure to the air and to cold becomes of a darker colour, and thicker conſiſtency. It is combined with reſin produced in the country, and uſed for paying the timbers of houſes, and the bottoms of boats, which it defends from rotting, and from the attacks of inſects. It is alſo burnt in lamps, and rubbed on the ſkin to cure cutaneous eruptions, bruiſes, and rheumatiſms.—The oppodeldoc, ſo much extolled in this country for curing ſprains, ſeems to be nothing elſe but purified coal-oil.

(1205.) The *bitumens properly ſo called*, are a more numerous claſs of bodies than the mineral oils.—In general, they ſeem to conſiſt of a reſinous ſubſtance combined with a greater or ſmaller proportion of mineral oil. When they firſt iſſue from the earth, they are generally of the conſiſtence of thin tar, but they become thick, and often conſolidate by expoſure to the air.

(1206.) They are of various colours, but generally brown or black. Their ſmell is diſtinguiſhed by the name of the *bituminous ſmell*, and when they are heated, or rubbed, ſomewhat reſembles that of ſwine. They become electric by friction; when heated they melt, and burn with a bright flame, and much ſmoke. They are all inſoluble in water, and moſt of them in alcohol;

but they are all ſoluble in ether, and in the fixed and volatile oils. They do not combine with alkalies, nor form ſoaps. The acids have little action on them; but the nitric acid diſſolves and acts upon them nearly in the ſame way as it does on reſins.

(1207.) To this claſs we would refer the *ſea-wax* or *maltha*, found on the lake Baikal in Siberia, which is white, and of the conſiſtence of white cerate, as Klaproth obtained a ſimilar ſubſtance by diſtilling wood coal in Germany. Perhaps alſo the mineral tallow deſcribed by Kirwan, and ſaid to be found on the coaſt of Finland and other parts of Sweden, may be referred to this claſs. Perhaps a white light ſubſtance, called *moſs-tallow*, which is found in the bottoms of peat bogs near Inverneſs, and other parts of this country, may alſo be a mineral bitumen; though we entertain ſome ſuſpicion it may have been the tallow of cattle which had been killed by huntſmen, and dropped there, when theſe bogs were woods, before the moſs grew up. Though this ſubſtance has not been particularly examined, we remarked that it differed from tallow in ſeveral reſpects, though it reſembled it in ſome others, particularly in its melting and inflaming.

(1208.) By far the moſt abundant ſpecies of mineral bitumen, is diſtinguiſhed by the name of *aſphaltum* or *mineral tar;* and it is every way ſimilar to the coal-tar of Lord Dundonald. Of this there is a conſiderable lake in the iſland of Trinidad, which is ſo much hardened on the ſurface by expoſure to the air, that people can walk upon it, though it is liquid below, and ſtill more fluid when it iſſues from the mineral ſtrata. This lake is ſuppoſed to have been the crater of a volcano, which has been filled up by bitumen flowing from contiguous ſtrata of coal. It abounds in Albania, and is ſuppoſed to have been the ſubſtance chiefly employed in preparing the Greek fire. It abounds alſo on the ſhores of the Dead Sea, in Paleſtine; and was uſed in place of mortar, for building the tower and walls of Babylon. The Egyptians employed it in embalming. It is ſaid to abound in Perſia, and ſeveral parts of Aſia. Conſiderable quantities of this ſubſtance often iſſue from the ſtrata of ſtone quarries in the county of Caithneſs. At firſt it is nearly as fluid as water, but by expoſure to the air, it acquires a darker colour, and the conſiſtence of tar. By long expoſure, it even becomes hard, and as black as jet.

(1209.) The colour of this bitumen is at firſt dark brown, and it always becomes blacker the longer it is expoſed to the air. Its ſpecific gravity varies from 1·07, to 1·65, according to Kirwan.

(1210.) Klaproth aſcertained that the aſphaltum of Albania is not ſoluble in alkalies, acids, water, or alcohol; but it is ſoluble in petroleum and all the oils, and in ſulphuric ether. Five parts of petroleum diſſolved one part of aſphaltum, and being gently evapourated, left a black brown ſhining varniſh. The ſolution in ether was of a pale brown red colour, and being evapourated, a reddiſh ſemitranſparent fluid ſubſtance was left, ſtill inſoluble in alcohol.

(1211.) A hundred grains of this aſphaltum being diſtilled by a heat gradually raiſed to redneſs, yielded

	Grains.
36 cubic inches (German) carbureted hydrogen gas,	16
A light brown fluid oil, or petroleum,	32
Water tainted with ammonia,	6
Charcoal,	30
Aſhes,	16
	100

The aſhes conſiſted chiefly of ſilica and alumina, with ſome lime, iron, and mangaueſe.

(1212.) As petroleum combined chiefly with a certain proportion of charcoal, forms bitumen, ſo bitumen, into whoſe compoſition a larger proportion of charcoal enters, forms mineral coal. Of this there are ſeveral varieties, but they may be claſſed under the general names of *brown coal*, and *black coal*. The brown coal has not been found in this country, but it abounds in ſome parts of Germany, and it contains ſome of the vegetable principles unchanged. The black coal abounds in Britain, and it may be regarded as the ſource of her wealth and proſperity. It is of two kinds. The *flaming* coal, which contains a conſiderable portion of bitumen in its compoſition,—and what is uſually called *blind coal*, becauſe it burns without flame, and has lately been called *glance coal* by Werner. This is found at Kilkenny in Ireland, in ſome parts of Airſhire, in the Iſland of Arran, on the banks of the grand canal, at Annfield, and different parts of Fifeſhire, and in ſome diſtricts of England. This laſt is charcoal, without bitumen, and hence it does flame; the flame of coal, like that of oil (1166) being owing to the combuſtion of bitumen after it is raiſed in vapour.—Beſides bitumen and charcoal, all theſe ſorts of coal contain a greater or ſmaller admixture of extraneous earths, and ſometimes of iron, ſulphur, and other ſubſtances.

(1213.) When the flaming coal is diſtilled in Lord Dundonald's method, it gives out a vaſt quantity of heavy inflammable air, or carbureted hydrogen gas: a bituminous oil, at firſt fluid, but gradually changes to the conſiſtence of tar; and water impregnated with ammonia. Lord Dundonald has applied the oil to the making of *varniſhes*. The reſidue is *coak*, or mineral charcoal, which yields a ſtrong and ſteady heat, and is of great uſe in various manufactures.

(1214.) Mineral caoutchouc is another ſpecies of bitumen, only found in Derbyſhire. It is ſo called from its reſemblance to vegetable caoutchouc, or *Indian rubber*. It effaces pencil marks from paper, but ſtains it a little. It is elaſtic; of a dark brown, and ſometimes of a red colour. It reſiſts all liquid menſtrua, but diſſolves in olive oil, according to Delametherie. Klaproth found it diſſolved in petroleum, the ſolution being of a bright yellow colour, and tranſparent. It burns with a bright flame, and melts by heat, retaining its tenacity after melting which is not the caſe with Indian rubber. After being melted it diſſolves in oils.

(1215.) Klaproth diſtilled one hundred grains of this ſubſtance by a heat gradually raiſed to redneſs, and obtained

	Grains
38 cubic inches (German) heavy inflammable air 4 inches—carbonic acid gas,	13·75
A thin brown bituminous oil, - - - -	73·0
Water ſlightly acidulous, - - - - -	1·5
Charcoal, - - - - - - - - - - -	6·25
Aſhes, - - - - - - - - - - - - -	5·5
	100·00

The aſhes conſiſted of lime and ſilica, with ſome iron, ſulphate of lime, and alumina.

(1216.) There is another bituminous ſubſtance connected with the Bovey coal in Devonſhire, to which Mr Hatchett aſſigned the name of *retin-aſphaltum*, and whoſe chemical properties he examined.—It is of a pale ochre yellow colour; brittle, and fracture vitreous; ſpecific gravity 1·135. It burns with a bright flame, and emits a fragrant odour, at laſt tainted with a bituminous ſmell. It melts, and after cooling, is black, brittle, and fracture vitreous. Water does not act upon it; but a portion diſſolves in alcohol, potaſh, and nitric acid; what diſſolves having the properties of a reſin, and the inſoluble part of an aſphaltum. Mr Hatchett found it compoſed of

reſin	55
aſphaltum	41
earths	3
	99

DIVISION V.

Alkalies.

(1217.) The word *alkali* or *the kali*, among the Arabians, denoted a plant from the aſhes of which one genus of this ſubſtance was extracted. When other ſubſtances were diſcovered, poſſeſſed of ſimilar properties, the ſame name was extended to them; and thus the word *alkali* came to ſignify a claſs of bodies.

(1218.) There are only three ſubſtances which have been diſtinguiſhed by the general name of *alkalies* and theſe are

I. Ammonia, or Vol. Alkali,
II. Pot-aſh
III. Soda.

(1219.) In (686) the diſcriminating marks of the acids are explained, and the alkalies, which are alſo of very great importance, both as chemical agents, and as inſtruments in arts and manufactures, are diſtinguiſhed from the acids, and from other bodies, by the following properties.

1. Their taſte is diſagreeably urinous and cauſtic.

2. They melt with a moderate heat, but with a ſtrong heat they are volatilized.

3. They combine with acids and deſtroy their acidity; while the cauſticity of the alkali is at the ſame time deſtroyed.

4. They are ſoluble in water even when combined with carbonic acid; which circumſtance diſtinguiſhes them from the alkaline earths.

5 They convert vegetable *blues* to a *green* colour.—If a piece of teſt paper be rendered red by being dipped in an acid, it will become green, on being dipped in an alkaline ſolution. On being dipped again in the acid it will reſume its red colour; and ſo on, it may be made alternately green and red until the colouring matter is waſhed off, and diffuſed through the liquor.

(1220.) Ammonia is called *volatile* or *vol. alkali*, becauſe it riſes in vapour with a very moderate degree of heat, or rather, when uncombined, it aſſumes the gaſeous form. The other two are called *fixed alkalies*, becauſe they require a red, or even a higher heat to raiſe them in vapour. Potaſh is alſo called *vegetable alkali*, becauſe it is chiefly extracted from the aſhes of vegetables; and Soda is ſometimes diſtinguiſhed by the name of *mineral alkali*, becauſe it is found in the mineral *kingdom*.

(1221.) The alkalies have been uniformly reckoned ſimple ſubſtances; but in (564 &c.) ammonia was ſhewn to be a compound of the hydrogen and azotic gaſes. The other two alkalies were ſtill reckoned ſimple ſubſtances. In a Pamphlet concerning the Iſland of Lewis, printed by Lord Seaforth, Mr Headrick ſtates that he found in *fuci*, or *ſea-weeds*, the ſalts uſually diſſolved in ſalt water, but no trace of alkali could be diſcovered by any teſts he employed. On heating theſe plants red hot, without admiſſion of air, they were charred, or converted into charcoal. In this ſtate they contained the ſame ſalts as before, but no trace of alkali. When the dried or charred fuci were burnt in the open air, the aſhes were found to contain potaſh and ſoda, and the quantity of theſe alkalies were found to be in proportion to the degree of combuſtion they had undergone.

(1222.) The ſoda he aſcribed to the decompoſition of the ſea-ſalt during the combuſtion of the plants, and the potaſh he aſcribed to the combination of oxygen, or ſome principle of the atmoſphere, with the mucilage, or ſome principle in the plants.—From theſe experiments he inferred that potaſh at leaſt, if not ſoda alſo, was not a ſimple ſubſtance, but formed during combuſtion by the combination of atmoſpheric oxygen with ſome ſubſtance exiſting in vegetables

(1223.) Still the old doctrine that pot-aſh and the other alkalies remained diſguiſed in vegetables, and were only developed and rendered ſenſible by combuſtion, or putrefaction, might be recurred to with ſome degree of plauſibility. No one had ſucceeded in decompoſing the fixed alkalies, and the proceſs by which they were formed in conſequence of the combination of oxygen with a vegetable principle, eſcaped the notice of our ſenſes.

(1224.) If our information be correct this great problem has at laſt been ſolved by Mr Davy of the Royal Inſtitution at London; a gentleman to whoſe ingenuity and induſtry the ſcience of chemiſtry is under great obligations, and of which we have taken ample advantage in the courſe of this work.—We underſtand that by directing a ſtream of the Galvanic fluid through ſolutions of potaſh and ſoda, from the powerful Galvanic battery of that inſtitution, he has ſucceeded in decompoſing theſe alkalies, and has found them to conſiſt of peculiar metallic ſubſtances combined with oxygen. He has alſo diſcovered that barytes, lime, and the other alkaline earths, are metallic ſubſtances combined with oxygen. That the baſes of theſe alkalies, and alkaline earths, have ſo ſtrong an attraction for oxygen that they ſuddenly combine with it when expoſed to the atmoſphere; and no ſubſtance is known which is capable of decompoſing the compound, excepting the powerful agency of the Galvanic fluid.—Thus what was only conjectured, ſynthetically, a good many years ago, from experiments juſt alluded to, ſeems now to be confirmed by analyſis; and the fixed alkalies, alkaline earths, and perhaps a numerous claſs of bodies which have hitherto been reckoned ſimple, muſt now change their place in chemical arrangement, and be ranked among the compounds. This will diminiſh the number of ſimple bodies; and it is to be hoped their number will continue to diminiſh, until what we have often hinted at be eſtabliſhed by unqueſtionable experiment, "That there is only one, or at moſt two, elementary bodies in Nature."

(1225.) The public waits with an impatience, ſuited to its importance, for a full explanation of diſcoveries fraught with ſuch momentous conſequences. If the accounts concerning them, which have reached us, be well founded, theſe diſcoveries are likely to produce a much greater revolution in chemiſtry than was effected by the pneumatic improvements in this ſcience, or by the moſt ſplendid diſcoveries of modern times. Meanwhile we are left to explain the properties of this, and other claſſes of bodies, according to the practice already received; leaving theſe diſcoveries, and the entirely new arrangement of the whole ſyſtem of chemiſtry, of which they ſeem productive, to a future edition of this work.

Sect. I. Ammonia or Vol. Alkali.

(1226.) The authors of the new nomenclature of chemiſtry aſſigned the name of *ammonia* to this ſubſtance becauſe it enters into the compoſition of *ſal ammoniac*, a ſalt which was firſt manufactured at the temple of Jupiter Ammon, in one of the *Oaſes*, or habitable iſlands in the ſandy deſerts contiguous to Egypt. But as they proceeded on the idea of its being a ſimple ſubſtance, an idea which has ſince been diſproved; and as it ſeems abſurd to load ſcience with names derived from fabulous and nonſenſical gods, we are rather diſpoſed to prefer the old name *volatile*, or *vol. alkali*.

(1227.) The vol. alkali when pure, uncombined with other bodies, is always in the form of a gas. In this ſtate it may be obtained by mixing three parts of quicklime with one part of ſal ammoniac in powder, in a retort which has its beak plunged below the mouth of a glaſs jar in a baſon of mercury. On applying the heat of a lamp to the retort, the lime combines with the muriatic acid in the compoſition of the ſal ammoniac, while the vol. alkali aſſumes its elaſtic or gaſeous form, and paſſing over diſplaces the mercury, and fills the glaſs jar.—The compoſition of this gas has already been explained, (564. &c.)

(1228.) The vol. alkali is emitted by a great variety of ſubſtances while they are undergoing the putrefactive fermentation. It is obtained by diſtilling the raſpings of the horns of ſtags, and is hence called *ſpirit of hartſhorn*. Alſo by diſtilling putrid urine, and it is hence called *ſpirit of urine*; and what is obtained from ſal ammoniac is commonly called *ſpirit of ſal ammoniac*. In theſe ſtates it is not pure, but combined with carbonic acid, or water. Its uſe as a ſtimulant to prevent fainting has been long known; but Dr Black firſt pointed out the difference between ammonia, and the carbonate of ammonia.

(1229.) The pure gas is colourleſs like air; has a very pungent, though not unpleaſant ſmell; its taſte is acrid and cauſtic, like that of the fixed alkalies, though not ſo ſtrong; nor does it, like them, corrode animal bodies. It kills animals when reſpired; it extinguiſhes lighted candles when plunged ito it, but previouſly enlarges their flame by the addition of another flame of a pale yellow colour. According to Kirwan its ſpecific gravity is 0·600, that of air being 1·00. But Davy who probably operated upon a purer gas, found it to be 0·5505. At the temperature of 60° a hundred cubic inches weigh, according to Kirwan, 18·16 grains, and according to Davy 17·068. Hence the weight of this gas is to that of common air, nearly as 3 to 5. When cooled to —45° this gas condenſes into a liquid, but by the addition of heat, it reſumes its elaſtic ſtate.

(1230.) When paſſed through a narrow ignited porcelain or glaſs tube, this gas is wholly decompoſed, and converted into hydrogen and azotic gas. When mixed with oxymuriatic acid gas, it takes fire, and the products are water, azote, and muriatic acid.

(1231.) It combines with water; and when a piece of ice is immerſed in this gas, it melts, combines with the gas, and at the ſame time becomes colder than it was before. Cold water abſorbs and condenſes more than a third of its weight of the gaſeous vol. alkali. The abſorption is rapid, with increaſe of heat, and the ſpecific gravity of the water is diminiſhed. This combination with water is the *ammonia* uſually employed by the chemiſts. When the compound of water and ammonia is heated to 130°, the ammonia ſeparates, and reſumes the gaſeous form. When cooled to —46° it cryſtallizes, and when ſuddenly cooled to —68° it becomes gelatinous, with ſcarcely any ſmell.

(1232.) Mr Davy aſcertained that a ſaturated ſolution of ammonia is compoſed of

74·63 water
25·37 ammonia

100·00

(1233.) The ſame ingenious chemiſt drew up the following Table, which exhibits the proportion of water and ammonia in 100 parts of liquid of different ſpecific gravities.

Specific gravity.	Ammonia.	Water.
0·9054	25·37	74·63
0·9166	22·07	77·93
0·9255	19·54	80·46
0·9326	17·52	82·48
0·9385	15·88	84·12
0·9435	14·53	85·47
0·9476	13·46	86·54
0·9513	12·40	87·60
0·9545	11·56	88·44
0·9573	10·82	89·18
0·9597	10·17	89·83
0·9619	9·60	90·40
0·9684	9·50	90·50
0·9639	9·09	90·91
0·9713	7·17	92·83

(1234.) Electric ſparks enlarge the volume of vol. alkaline gas, and decompoſe it into its conſtituent ingredients, namely hydrogen gas and azotic gas. By this proceſs 1·7 cubical inches of the alkaline gas are enlarged into 3·3 cubic inches. If a mixture of common air or oxygen gas, with this alkaline gas, be made to paſs through an ignited porcelain tube, a detonation takes place; water is formed by the combination of oxygen with the hydrogen in the compoſition of the alkaline gas, and the azotic gas is ſet free. If the oxygen gas be in ſuperabundance, a portion of nitric acid is formed in conſequence of its combination with the azotic gas.

(1235.) This gas combines with ſulphur when the latter is in a ſtate of vapour. To effect this combination a mixture of five parts of ſal ammoniac, five parts of ſulphur, and ſix of quicklime, are diſtilled from a retort. A liquor is obtained of a deep orange, or red colour, which exhales a fetid odour, and conſiſts of the alkaline gas combined with ſulphur. This ſulphuret decompoſes water, and forms *hydrogureted ſulphuret of ammonia*, which, as it was firſt formed by Boyle, formerly obtained the name of *fuming liquor of Boyle*. When the vol. alkaline gas is made to paſs through phoſphorus in a red hot tube, it is decompoſed, and phoſphureted hydrogen gas, and phoſphureted azotic gas, are formed. When paſſed through red hot charcoal, part of the charcoal combines with it, and forms *pruſſic acid*. When the muriatic and vol. alkaline gaſes are mixed together, they ſuddenly concrete into the ſolid ſalt called *muriate of ammonia*, or *ſal ammoniac*.

(1236.) Vol. alkali acts upon copper, zinc, tin, and iron, and oxidizes them ſuperficially. It appears that during this proceſs part of the water in union with the alkali is decompoſed, as hydrogen gas is emitted.

(1237.) Liquid vol. alkali diſſolves the oxides of ſilver, copper, iron, tin, nickel, zinc, biſmuth, and cobalt. To effect this combination, the vol. alkali may be poured upon theſe oxides after they have been precipitated from ſolution in acids; or it may be firſt uſed to effect their precipitation, and then more of it added to diſſolve the precipitates. The ſolution of oxide of copper in vol. alkali is of a beautiful blue colour, which, according to Sage, is capable of cryſtallizing; and the late Dr Irvine thought the vol. alkali might be uſed as a teſt to diſcover the preſence of copper in ſprings and other liquids. When digeſted upon the oxides of mercury, lead, or mangane ſe, with a conſiderable heat, water and nitric acid are formed, and azotic gas is emitted; ſhewing that the vol. alkali is decompoſed.

Fulminating Gold.

(1238.) If gold be diſſolved in the nitro-muriatic acid, and the ſolution be diluted with thrice its weight of water, and then the oxide of gold be precipitated by dropping in vol. alkali by little and little at a time, the oxide of gold goes to the bottom in fine yellow powder, in union with a portion of the vol. alkali, care muſt be taken not to add too much of the alkali, which would rediſſolve a part of the precipitate. This powder being waſhed, and ſlowly dried, upon filtering paper, ſhould be put into a phial which is not corked, but cloſed with a ſlip of paper, or of cloth, tied round its mouth, as the friction of a cork is apt to make it explode. This yellow powder is *fulminating gold*, and it conſiſts of five parts of the yellow oxide of gold, united with one part of vol. alkali.

(1239.) The fulminating gold explodes ſuddenly, with a tremendous noiſe, when ſtruck with a hammer, or when rubbed in a mortar, or when heated to between 248° and 540°. If the quantity amount to about 12 grains, it lacerates the metallic plate on which it is exploded. When heated in cloſe veſſels ſo ſtrong as to reſiſt its action, it is ſlowly decompoſed, without exploſion.

(1240.) This preparation ſeems firſt to have been diſcovered by Baſil Valentine, and it long continued to attract the attention of chemiſts. Bergman and Scheele ſeem to have been the firſt who offered any rational ſolution of its mode of operating. Berthollet in 1786, and Lavoiſier after him, completed the explanation of the phenomenon. During the exploſion, the hydrogen of the ammonia combines with the oxygen of the oxide, and forms water; while the azote in the compoſition of the ammonia aſſumes its elaſtic or gaſeous form. Thus there is a mutual decompoſition of the ammonia, and of the oxide, the latter, being deprived of its oxygen, returns to its metallic ſtate of gold. The water formed, and the azote let looſe, are farther immenſely expanded by the high degree of heat which is generated during the exploſion.—One prominent cauſe of the violence of this exploſion, is the ſuddenneſs with which the gaſes aſſume the elaſtic form; for the Royal Society aſcertained that the quantity of gas, emitted from a given weight of fulminating gold, was inferior to that emitted by the ſame weight of gun-powder: though the latter, by burning more ſlowly, does not fulminate with ſuch violence as the gold.

Fulminating Silver.

(1241.) This was diſcovered by Berthollet in 1788, and is a ſtill more formidable compoſition than the fulminating gold.—Very pure ſilver being diſſolved in nitric acid, is precipitated by means of lime water. The precipitate is thrown upon filtering paper to abſorb the water and nitrate of lime with which it is mixed. Then pure liquid vol. alkali is poured upon it, and allowed to remain for 12 hours. The alkali combines, and converts the precipitate into a black powder, which is fulminating ſilver. The liquid being cautiouſly decanted off, the black powder is placed in very ſmall portions, on bits of filtering paper, and allowed to dry very ſlowly. Even while moiſt it explodes when ſtruck with force; but when dry it fulminates, with exceſſive violence, by the ſlighteſt touch. The application of a moderate heat alſo cauſes it to fulminate. When the liquor which had been decanted from this black powder, is heated in a retort, azotic gaſs eſcapes, and ſmall cryſtals, with a metallic luſtre, are formed. Theſe fulminate when touched, even while covered by the liquid, and often ſhiver the veſſels in which they are kept. Theſe cryſtals are a portion of the fulminating ſilver which had been diſſolved in the liquor, and which had cryſtallized in conſequence of evapouration.

(1242.) The explanation of this phenomenon is the ſame with that of the fulminating gold. Fulminating ſilver is a compound of oxide of ſilver and ammonia. During the exploſion the oxygen of the oxide unites with the hydrogen of the ammonia, forming water; while the azote of the ammonia aſſumes its elaſtic form. The ſilver returns to its metallic ſtate. The violence of the fulmination is much increaſed by the exceſſive heat generated during the proceſs.

FULMINATING MERCURY.

(1243.) This was lately diſcovered by Fourcroy, and is formed by digeſting red oxide of mercury, during eight or ten days, in a ſtrong ſolution of pure vol. alkali in water. The oxide aſſumes a white colour, and is at laſt covered by ſmall cryſtalline ſcales. This detonates loudly when thrown upon burning coals; but it loſes its power of fulminating, and undergoes ſpontaneous decompoſition, in the courſe of a few days. When expoſed to a low heat the vol. alkali is alſo expelled, and the oxide reſumes its former red appearance.

(1244.) The volatile alkali has been uſed with great ſucceſs in the lately invented proceſs by Sir John Dalrymple of bleaching by ſteam. For this purpoſe the cloth is hung or laid looſe in a large vat, or any cloſe wooden veſſel, furniſhed with a double bottom bored full of holes. A large ſtill is charged with urine, and a mixture of quicklime, to abſorb the carbonic acid from the volatile alkali, or to render it *cauſtic*. The neck of the ſtill paſſes into the vat between the under bottom, and the perforated upper bottom or brander; and being made to boil, the ſteam conſiſting of vol. alkali and water, fills the whole vat, and penetrates every pore of the cloth. By covering the vat with a cloſe lid, and having a valve like that of the boiler of a ſteam-engine, to regulate the preſſure, the heat of the ſteam may be raiſed much higher than the vapourific point of water. In this high temperature, the vol. alkali combines with the colouring matter, the oil and other impurities of the cloth, and renders them ſoluble in water, ſo that they trickle down to the ſpace between the two bottoms. A ſide pipe conveys what liquor is condenſed back to the bottom of the ſtill, ſo that it can be circulated back through the vat, until the whole of the vol. alkali has combined with the oil or colouring matter of the cloth.

(1245.) The affinities of ammonia or vol. alkali with acids, are in the following order.

Sulphuric,
Nitric,
Muriatic,
Phoſphoric,
Phoſphorous,
Fluoric,
Oxalic,
Tartaric,
Arſenic,
Succinic,
Citric,
Lactic,
Benzoic,
Sulphurous,
Acetic,
Saclactic,
Boracic,
Carbonic,
Pruſſic.

(1246.) The compounds of vol. alkali with acids are commonly diſtinguiſhed by the name of *ammoniacal ſalts*. As there are not many of theſe preſented by nature, and very few of them have been applied to any uſe, it will ſeldom be neceſſary to enter very fully into a deſcription of their properties.

I. SULPHATE OF AMMONIA.

(1247.) This was firſt diſcovered by Glauber, and called *ſecret ſal ammoniac*, and *vitriolated ammoniac*. It may be formed by pouring ſulphuric acid upon ſal ammoniac, or by ſaturating the acid with ammonia, or vol. alkali. It is ſoluble in twice its weight of water at 60°, and in its own weight of boiling water. It has a ſharp bitter taſte, and cryſtallizes into ſmall ſix-ſided priſms, whoſe planes are unequal, terminated by ſix-ſided pyramids. By a heat approaching to redneſs it is moſtly decompoſed. The conſtituents of this ſalt, when in cryſtals, are, according to Kirwan,

Acid - - - -	54·66
Ammonia -	14·24
Water - - -	31·10
	100·00

II. SULPHITE OF AMMONIA.

(1248.) This ſalt is formed by paſſing a ſtream of ſulphurous acid gas, by means of a bent tube, or from the beak of a retort, through an aqueous ſolution of vol. alkali. Its taſte is cool and penetrating, with a ſulphureous flavour. It is ſoluble in its own weight of cold water, but in greater proportion in boiling water, ſo that it cryſtallizes on cooling in ſix-ſided priſms, terminated by ſix-ſided pyramids; or in four-ſided rhomboidal priſms, terminated by three-ſided ſummits. Expoſed to the air, it attracts water and oxygen, and is ſoon converted into *ſulphate*. (1247.) It is decompoſed by heat. Its conſtituent parts are

Sulphurous acid	60
Ammonia - - -	29
Water - - - - -	11
	100

III. Nitrate of Ammonia.

(1249.) This ſalt was formerly called *nitrous ſal ammoniac*, and *inflammable nitre*. It has been particularly examined by Berthollet and Davy. It is prepared by ſaturating nitric acid with ammonia, or with the carbonate of ammonia, and evapourating the ſolution until the ſalt cryſtallizes.

(1250.) The appearance of the cryſtals varies with the heat employed in evapourating the ſolution. They are commonly ſix-ſided priſms, terminated by long ſix-ſided pyramids. Sometimes they are in long, ſilky, and elaſtic threads. The taſte is acrid, bitter, and diſagreeable. The ſpecific gravity 1·5785. At 60° two parts of water diſſolve one of this ſalt; and it diſſolves in half its weight of boiling water. It deliqueſces when expoſed to the air.

(1251.) The moſt remarkable property of this ſalt is, that when heated above 600°, or when thrown upon a red hot iron, it detonates with a loud noiſe, and a white flame. During the exploſion, both the acid and alkali are mutually decompoſed, and nitrous acid, nitrous gas, azotic gas, and water are formed. We have not heard of any attempts to make it the baſis of gunpowder. Mr Davy has preſented us with the component parts of this ſalt in its three different ſtates.

	Fibrous.	Priſmatic.	Compact.
Nitric acid	72·5	69·5	74·5
Ammonia	19·3	18·4	19·8
Water	8·2	12·1	5·7
	100·0	100·0	100·0

IV. Muriate of Ammonia.

(1252.) This ſalt is alſo called *ſal ammoniac*, from the temple of Jupiter Ammon in Lybia where it was firſt made, ſome ſay from the dung of cattle, particularly of camels, as frequently hinted at. It was well known to the Greeks and Romans, and employed by them in various arts. During ſeveral ages it was nowhere to be found except in Egypt, and its mode of preparation is ſaid to have been brought to Europe by a French nobleman in 1719 who engaged himſelf as a workman at one of its manufactories. In Egypt it is prepared from the excrements of animals which feed on ſaline plants. The excrements are dried and burnt in furnaces conſtructed on purpoſe, or are uſed as fuel; and it is from the ſoot of theſe excrements that ſal ammoniac is extracted by ſublimation.

(1253.) It is found, ready formed, and mixed with ſulphur and arſenic, in the craters and neighbourhood of volcanos, where it ſeems to have been ſublimed. It alſo occurs in the mountains of Thibet and Tartary, in grottos near Puzzuoli, and diſſolved in the waters of ſome lakes in Tuſcany.—Its nature was firſt examined by Geoffroy and Duhamel; and its properties were fully illuſtrated by Black, Bergman, Scheele, Berthollet and Fourcroy. In its original ſtate it contains ſeveral impurities which muſt be ſeparated before it is fit for uſe.

(1254.) The manufacture of this ſalt was firſt introduced into this country by Dr Black, and it is prepared by ſeveral different proceſſes. Sometimes the muriate of lime, or of magneſia, contained in the liquid refuſe of common ſalt, are precipitated by means of carbonate or vol. alkali obtained by diſtilling putrid urine, or other animal ſubſtances, or from ſoot, in which this carbonate abounds. The vol. alkali combines with the muriatic acid, forming ſal ammoniac, which remains diſſolved in the liquor; while the carbonate of lime or magneſia goes to the bottom. The liquor being drawn off, and evapourated to dryneſs, the ſal ammoniac is ſublimed from the reſiduum.—Sometimes ſoot, or vol. alkaline liquor, are mixed with common, or marine ſalt, to which ſulphuric acid being added, it combines with the baſis of common ſalt, forming ſulphate of ſoda, while the muriatic acid combines with the vol. alkali, forming ſal ammoniac.—At other times it is formed directly, by ſaturating muriatic acid with vol. alkali.—When formed in this way, on a large ſcale, the vapour of ammonia diſtilled from putrid animal ſubſtances mixed with quicklime, is thrown into a leaden chamber, where it combines with the vapour of muriatic acid thrown in from a ſeparate veſſel, and forms ſal ammoniac.—A portion of this ſalt, as well as carbonate of ammonia, is alſo found in the ſoot of pit-coal, and is extracted from it by ſublimation.

(1255.) This ſalt is uſually ſublimed, with a view to ſeparate it from impurities which are leſs volatile than itſelf. This proceſs is performed in large glaſs, or earthen bottles, which are placed in a ſand-bath, having a gradually increaſing heat applied to them during three or four days. The ſal ammoniac riſes in vapour to the upper part of the bottle, where it concretes, and forms a cake in ſome degree elaſtic. After the apparatus has cooled, the bottles are broken, and the cakes removed.

(1256.) The taſte of the ſalt thus formed, is pungent, acrid, and cooling. Its ſpecific gravity, according to Dr Watſon, is 1·450. It is ſoluble in 3·25 times its weight of cold water; and 100 parts of alcohol of the ſtrength 0·834 diſſolve 1⅕ of this ſalt. Great cold is produced by the ſolution of this ſalt in water, and hence its ſolution is employed in warm countries for cooling their liquors; and when mixed with ſnow or ice it produces intenſe artificial cold. By evapourating its ſolution in water, it cryſtallizes into long four-ſided pyramids, or forms plumoſe cryſtals. The compact ſalt is not affected by the air; but the cryſtals are apt to deliqueſce.

(1257.) When heated it ſublimes in white ſmoke, of a peculiar ſmell. When ſublimed along with gold leaf, there riſes an amethyſt coloured matter, which forms a purple coloured ſolution with water, and yields by filtration a purple powder. Hence this ſalt ſeems capable of oxidizing gold.

(1258.) The conſtituents of this ſalt are nearly in the following proportion.

Muriatic

Muriatic acid -	48·
Ammonia - - -	14·9
Water - - - - -	37·1
	100·0

(1259.) Few ſalts are of more extenſive uſe than the muriate of ammonia. The preceding and ſubſequent parts of this work, may ſhew it to be of very general application in the various proceſſes of chemiſtry. It is much employed in medicine, and in the preparation of colours for dyeing. In metallurgy it is much employed in the indication, and ſeparation of certain metallic ſubſtances. It is uſed to clean and coat the ſurface of copper, and other metals, to prevent their oxidation, in the proceſs of obtaining and plating them with another metal. For the ſame purpoſe, it is alſo of indiſpenſible uſe in ſoldering.

V. Hyperoxymuriate of Ammonia.

(1260.) This ſalt has only been formed by Mr Chenevix, by pouring carbonate of ammonia into a ſolution of an earthy hyperoxymuriate. The earthy carbonate goes to the bottom, and the hyperoxymuriate of ammonia remains in ſolution. This ſalt is very ſoluble in water and in alcohol; and is decompoſed at a very low temperature. It has only been deſcribed by Mr Chenevix; and neither its properties, nor the proportion of its conſtituent ingredients, have been ſufficiently aſcertained.

VI. Fluate of Ammonia.

(1261.) This ſalt may be prepared by ſaturating the fluoric acid with ammonia; or if a mixture of ſulphate of ammonia and fluor ſpar be expoſed to heat, fluate of ammonia ſublimes.—It is ſoluble in water, and by evapouration cryſtallizes in ſmall needles or priſms. Expoſed to heat, part of the ammonia ſeparates, and the remainder ſublimes, having the acid in exceſs.

VII. Phosphate of Ammonia.

(1262.) This ſalt exiſts in urine, in connection with the muriate and phoſphate of ſoda, with which it has long been confounded under the names of *fuſible ſalt*, *native ſalt of urine*, and *microcoſmic ſalt*. It was firſt accurately diſtinguiſhed from the others by Rouelle, and afterwards more fully examined by Lavoiſier and Vauquelin. At firſt it was extracted from urine, and many proceſſes were adopted for rendering it pure.

(1263.) It is now uſually prepared by ſaturating the phoſphoric acid with ammonia.—Or it may be prepared by ſaturating with ammonia, the ſuperphoſphate of lime obtained from bones. The ſolution being ſufficiently evapourated, the phoſphate cryſtallizes on cooling.

(1264.) Its cryſtals are four-ſided priſms, terminated by equal-ſided pyramids; ſometimes ſmall cloſely interwoven needles. It has a cooling, ſalt, and ammoniacal taſte, and changes the ſyrup of violets to a green colour. Its ſpecific gravity is 1·8051.

(1265.) Expoſed to heat it melts in its water of cryſtallization and ſwells, and after its water is expelled it is converted into a tranſparent glaſs, from which it derived the name of *fuſible ſalt*. In this ſtate it is found to have loſt part of its alkaline baſe; and this is the only alkaline or earthy phoſphate which is decompoſed by heat, and which yields phoſphorus when heated with charcoal. It is readily decompoſed by the ſulphuric, nitric, and muriatic acids; and by the two fixed alkalies.

(1266.) The phoſphate of ammonia is much uſed as a flux in eſſaying mineral ſubſtances with the blow-pipe. It is alſo employed in the fabrication of coloured glaſſes, and artificial imitations of the precious ſtones.

VIII. Phosphite of Ammonia.

(1267.) This ſalt is formed by ſaturating the phoſphorous acid with ammonia, or with the carbonate of ammonia. By evapourating to a proper conſiſtency, it cryſtallizes by ſlow cooling.

(1268.) Its cryſtals are long tranſparent needles; ſometimes four-ſided priſms terminated by four equal ſided pyramids. Its taſte ſharp and ſaline. It is ſoluble in twice its weight of water at 60°, and more ſoluble in boiling water. It is ſlightly deliqueſcent when expoſed to the air.

(1269.) When heated on charcoal by the blow-pipe, it boils, and loſes its water of cryſtallization. It then begins to vitrify, and is ſurrounded with a phoſphoreſcent light. Bubbles of phoſphureted hydrogen gas eſcape, which burn with a bright flame, and form in the air rings, or coronets, of white phoſphoric acid vapour. The ſalt is decompoſed, and there remains phoſphoric acid in its vitreous ſtate. The ſame effects take place when the ſalt is heated in a glaſs bulb, from which a tube projects under the ſurface of mercury. The bubbles of phoſphureted hydrogen gas take fire when they eſcape from the ſurface of the mercury, and the white coronets ſlowly aſcend through the air. The conſtituent parts of this ſalt are

Phoſphorous acid,	26
Ammonia - - - -	51
Water - - - - - -	23
	100

IX. Carbonate of Ammonia.

(1270.) This ſalt has long been uſed for various purpoſes, but its nature and compoſition were firſt explained by Dr Black. It was formerly obtained by diſtilling various ſubſtances, ſuch as horns, bones, urine, &c. and obtained names from the various ſubſtances from which it was extracted. It was alſo called *concrete volatile alkali*, *aërated volatile alkali*, and *cretaceous ſal ammoniac*.

(1271.) Mr Davy has aſcertained that the component parts of this ſalt vary exceedingly according to the manner of preparing it. One ſpecies contains a ſmaller proportion of carbonic acid, and is therefore diſtinguiſhed by the name of *ſub-carbonate*; and the other ſpecies contains the higheſt proportion of carbonic acid, and is therefore called a *carbonate*. Between the extremes there are many variations in the proportions.

(1272.) The *ſub-carbonate* may be prepared by combining certain proportions of carbonic acid gas, with ammoniacal gas, in a jar over mercury, when the two gaſes uniting form a concrete ſalt.

But it is commonly prepared by mixing two parts of chalk, with one part of muriate of ammonia, both as dry and well powdered as poſſible. The muriatic acid combines with the chalk, while the carbonic acid combines with the volatile alkali, forming the ſalt in queſtion. The mixture being put into an earthen retort, and heat applied, the ſub-carbonate of ammonia paſſes over, and forms a white chryſtalline incruſtation upon the ſides of the retort, which ought to be kept very cool. In this way the bottles containing what are called *dry ſalts*, are prepared.

(1273.) The *ſub-carbonate* of ammonia forms ſmall irregular cryſtals. It has the ſame ſmell and taſte with the pure ammonia, though leſs ſtrong. It changes vegetable blues to green, as the pure alkalies do. Its ſpecific gravity is 0·966. Cold water diſſolves leſs than half its weight of it; hot water its weight; but in boiling water it is thrown off in vapour. Davy has aſcertained that the proportions of carbonic acid in the compoſition of this ſalt, vary according to the temperature at which it is formed. The following may be regarded as the medium.

Carbonic acid,	45,
Ammonia,	43,
Water,	12,
	100.

(1274.) The *Carbonate* of ammonia is obtained by expoſing the *ſub-carbonate* to the air, or by paſſing a ſtream of carbonic acid gas through a ſolution of it in water. It cryſtallizes in ſix-ſided priſms, has no ſmell, and much leſs taſte than the ſub-carbonate. According to Schrader, its conſtituent parts are,

Carbonic acid,	56,
Ammonia,	19,
Water,	25,
	100.

(1275.) The carbonates of ammonia are decompoſed by all the acids, with violent efferveſcence. They are uſed in medicine, and in the manufacture of ſal ammoniac, as already explained. Their uſe as ſtimulants, in ſmelling bottles, or mixed with volatile oils as perfumes, has long been known.

X. Arseniate of Ammonia.

(1276.) This ſalt is formed by ſaturating the arſenic acid with ammonia. The ſalt chryſtallizes, and when ſubjected to a ſtrong heat, is decompoſed. Water is formed, arſenic ſublimed, and azotic gas let looſe.

XI. Acetate of Ammonia.

(1277.) This ſalt is formed by ſaturating acetic acid with carbonate of ammonia. It was formerly called *ſpiritus Mindereri*, and is ſo volatile that it can hardly be cryſtallized, except by very ſlow evapouration. In this caſe it forms needle-ſhaped cryſtals. M. de Laſſone effected its cryſtallization by ſublimation, when it formed cryſtals about an inch and eight tenths in length, ſlender, and flatted, and terminating in ſharp points. Its taſte is at firſt cooling, then ſweet, and followed by a taſte reſembling that of a mixture of ſugar and nitre. It is deliqueſcent; melts at 170°; and riſes in vapour at about 250°. When a ſolution of this ſalt is diſtilled, it firſt yields ammonia, then acetic acid, and laſtly the ſalt itſelf comes over. By ſome it is eſteemed a cooling, or *febrifuge* ſalt, though we do not know of any authentic experiments to aſcertain its efficacy in theſe caſes.

XII. Oxalate of Ammonia.

(1278.) This ſalt is formed by ſaturating the oxalic acid with ammonia, and by evapouration cryſtallizes in four-ſided priſms, terminated by dihedral ſummits. This ſalt is not ſoluble in alcohol. By diſtillation it yields carbonate of ammonia; ſome of the ſalt comes over unchanged, and charcoal remains behind. This ſalt may alſo be formed with the acid in exceſs, ſo as to conſtitute a *ſuper-oxalate.*—It is of great uſe in detecting the preſence of lime in liquids, which it precipitates when its ſolution is dropped in.

(1279.) It does not ſeem neceſſary to detail the compounds of ammonia with the other acids, with all of which it combines, and forms neutral ſalts. We thought it ſufficient to deſcribe theſe compounds which ſerve to illuſtrate the compoſition of ammonia, or which are applicable to ſome uſeful purpoſe.

(1280.) Ammonia alſo enters into compoſition with alcohol, and with ether. The *ſoaps* it forms with *oils* ſhall be conſidered afterwards.

Sect. II. Potash.

(1281.) The uſes of potaſh ſeem firſt to have been diſcovered by the ancient Gauls, as Pliny informs us they were the inventors of ſoap, which they compounded of aſhes and tallow. It has long been known under the name of *aſh*, or *aſhes*, and it is called *pot-aſh* from the iron pots in which it is prepared. It has alſo paſſed under various names, derived either from the ſubſtances from which it was procured, or from the mode of its preparation. Thus it was called *al-kali* by the Arabian chemiſts, from the plant *kali*, from whoſe aſhes it was extracted; *ſalt of tartar* from the name given to the lees of wine which yield it in abundance, and this name it ſtill retains in the ſhops; *alkali of nitre*, becauſe it forms the baſis of this ſalt; and *vegetable alkali*, becauſe it was ſuppoſed to exiſt only in vegetables.

(1282.) America, Ruſſia, and thoſe countries which abound in wood, and where wood is uſed as common fuel, furniſh great quantities of potaſh. The wood aſhes have ſucceſſive additions of water poured upon them, until the liquid comes off taſteleſs. The ley being filtered, and evapourated to dryneſs in iron pots, the ſubſtance is obtained which is known in commerce under the name of *potaſh*. In the Highlands of Scotland the people burn great quantities of fearns and bruſhwood, in order to obtain potaſh from their aſhes. In this ſtate, though the potaſh be ſufficiently pure to exhibit ſome of its properties, and for ſome of the coarſer operations of manufacture, it is far from being fit for other operations, or for the purpoſes of chemical reſearch.

(1283.) When the potaſh is heated to redneſs, ſome of theſe impurities are burnt off, it acquires a much whiter colour, and is known in commerce under the name of *pearl-aſh*. Still, however, it contains a mixture of foreign bodies, and is itſelf combined with carbonic acid, which neutralizes or deſtroys its action on other ſubſtances.

(1284.) From what was ſtated (1224) it would appear that potaſh is not a ſimple ſubſtance, as it has been hitherto eſteemed by chemiſts; but that it is a product of combuſtion, formed by the combination of atmoſpheric oxygen with ſome baſis exiſting in plants. It is hoped the experiments of Mr Davy will ſoon remove any doubt that may be entertained on this point.

(1285.) To abſtract the carbonic acid from potaſh, and render it *cauſtic*, or capable of combining with oil and other ſubſtances, the ſoap-makers and bleachers make uſe of quick-lime, which has a ſtronger attraction for carbonic acid than potaſh, and forms with it an inſoluble compound. But their leys, even after they are rendered cauſtic by quicklime, contain other ſalts and ſubſtances in ſolution as well as potaſh; and for chemical inveſtigations it is a great deſideratum to obtain potaſh in a ſtate of abſolute purity.

(1286.) To obtain potaſh in a ſtate of purity, the following proceſs is recommended by Berthollet. Mix *ſalt of tartar*, or *pearl-aſh*, with double its weight of quicklime, and add eight or ten times the weight of the whole mixture of diſtilled or rain water. Boil the mixture two or three hours in a clean iron veſſel, and then place it 48 hours in a cloſe glaſs veſſel, ſhaking it occaſionally. Then paſs it through a filter, and boil the liquid thus obtained with a ſtrong heat, until it be evapourated to the conſiſtence of honey; when cold. Pour upon this concentrated liquor a quantity of alcohol equal in weight to one third of the pearl-aſh employed. Shake the mixture, and boil it a minute or two on the fire, then pour it into a glaſs veſſel and cork it up. The pure potaſh combines with the alcohol, and riſes to the upper part of the veſſel; while the impurities, in a ſolid form, or diſſolved in water, go to the bottom. The alcohol ſolution is of a reddiſh brown colour, which muſt be decanted, or drawn off with a ſyphon, into a ſilver pan. Boil it rapidly in this pan to expel the alcohol, until a black cruſt forms on the ſurface, and the liquid below, on cooling, becomes ſolid. Remove the black cruſt, and pour the warm ſolution into a porcelain veſſel. On cooling it conſolidates into a beautiful white ſubſtance, which ſhould be broken in pieces, and put into an air-tight phial.—This is pure potaſh.

(1287.) Profeſſor Lowitz of Peterſburgh propoſed a leſs expenſive proceſs than this.—The potaſh and quicklime are mixed and boiled together, as above directed. The liquor is then filtered, and evapourated, until a thin pellicle is formed on the ſurface, and afterwards allowed to cool. It now depoſits cryſtals of foreign ſalts which are removed. The evapouration is again repeated, in a clean iron pot, and the pellicle which forms upon the ſurface is ſkimmed off with an iron ſpoon. When no more pellicle forms, and the matter ceaſes to boil, it is removed from the fire, and conſtantly ſtirred with an iron rod while cooling. It is then diſſolved in double its weight of cold water, paſſed through a filter, and evapourated in a glaſs retort until it begins to depoſit regular cryſtals. When a ſufficient number of cryſtals have been obtained, the brown liquor which ſwims over them, is decanted off, and kept in a cloſe bottle until the brown matter has gone to the bottom. The clear liquid being decanted off, is evapourated as before, and allowed to depoſit more cryſtals by cooling; and this proceſs is repeated as long as any cryſtals can be obtained. The limpid ſolution that remains after all theſe extraneous ſalts have been removed by cryſtallization, is pure potaſh in union with water; and it muſt be kept in a cloſe phial, to prevent its re-abſorption of carbonic acid.

(1288.) Klaproth boils equal parts of ſalt of tartar, and lime burnt from Carrara marble, or oyſter ſhells, with a ſufficient quantity of water, in a kettle of poliſhed iron. The ley is then paſſed through a linen cloth, and boiled until its quantity be reduced to about double the weight of the potaſh. It is then ſtrained a ſecond time through a cloth, and put into a cloſe glaſs bottle. After ſome days it depoſits a ſediment, from which the clear liquor is decanted into another bottle, and kept for uſe.—By employing pure lime he avoids a contamination of his ley with ſilex, or aluminous earth, which always are mixed in ordinary limeſtones; and he leaves a ſmall portion of carbonic acid in union with his alkali, that he may be certain the liquor does not diſſolve any of the lime.

(1289.) The theory of the depuration of alkalies, or rendering them *cauſtic*, as it is commonly termed, was firſt illuſtrated by Dr Black. He obſerved that when ſulphuric acid, for example, was poured upon a mild alkali, it produced a violent efferveſcence, becauſe in combining with the alkali it diſplaces the carbonic acid formerly in union with it, and cauſes it to aſſume its gaſeous, or elaſtic form. When a mild alkali is mixed with quick-lime, the lime having a ſtronger attraction for carbonic acid than the alkali, withdraws it from the latter, and combining with this acid reverts to its ſtony, or inſoluble ſtate. Accordingly the lime gains as much weight during the proceſs as is loſt by the alkali. A mild alkali, then is, in fact, a neutral ſalt, or a compound of carbonic acid and pure alkali; and a pure, or cauſtic alkali, is one from which this carbonic acid has been abſtracted.

(1290.) About the ſame time that Dr Black was occupied with theſe important inveſtigations, Mr Meyer in Germany publiſhed another theory to account for the phenomena. He ſuppoſed that the lime, during the proceſs of burning, combined with ſome particular ſubſtance, compoſed of an acid principle, and fixed fire, to which he gave the name of *acidum pingue* or *cauſticum*. That the lime transferred this fiery acid to the alkali, and reverted to its ſtony ſtate; while the alkali being ſaturated with this acid, became cauſtic in its turn.—The theory of Dr Black appeared ſo ſimple and ſatisfactory, that it was at laſt adopted by Meyer himſelf.

(1291.) Potaſh, when thus obtained pure, and evapourated to dryneſs, is a white brittle ſubſtance, of a ſmell ſimilar to that emitted by ſlacking lime, and of an extremely acrid taſte. It is a violent corroſive, and almoſt inſtantly deſtroys any part of the body to which it is applied. It has hence acquired the name of *cauſtic*, and it is uſed by ſurgeons under the name of the *potential cautery*, to conſume excreſcences, and to open abſceſſes. Its ſpecific gravity is 1·7085.

(1292.) With a moderate heat it melts; and at a red heat it ſwells and ſlowly evapourates in white acrid ſmoke. A ſtronger heat conveys to it a greeniſh tinge. Expoſed to the air it abſorbs moiſture and deliqueſces; and at the ſame time combines with carbonic acid.

(1293.) One part of cold water diſſolves two of potaſh, and the ſolution is of the conſiſtence of oil. It is in this liquid ſtate that potaſh is uſually employed by the chemiſts. Four parts of potaſh in powder, and one of ſnow, being mixed together melt: and this mixture was employed by Mr Lowitz to produce artificial cold. When a ſolution of potaſh is evapourated to the proper conſiſtency, it cryſtallizes, and the cryſtals vary according to the circumſtances in which they are produced. They are either octohedrons in groups, or thin tranſparent blades which interſect each other ſo curiouſly, that the liquid part is locked up within their cells.

(1294.) Potaſh is a powerful agent in chemical inveſtigation. It is often employed in medicine, and it is of moſt extenſive uſe in arts and manufactures. In bleaching it is employed to diſſolve and abſtract the oil and colouring matter of the cloth. In this caſe it is commonly uſed in the ſtate of *pearl-aſh*; but if it be rendered cauſtic by lime, as its energy is much increaſed, a much ſmaller quantity ſhould be applied, to prevent it from corroding the cloth. This circumſtance deters many bleachers from uſing the cauſtic alkali; but if their ley be proportionally reduced in ſtrength, the cauſtic potaſh is as ſafe as the carbonate uſually employed. In the proceſs of bleaching by ſteam, deſcribed (1244) if urine or volatile alkali cannot be got, the cloth is firſt dipped in a very weak ley of potaſh, and then expoſed to the ſteam of water in the large wooden vat or chamber, as already ſtated.—But the uſes of this ſubſtance will be deſcribed in their order.

(1295.) The affinities of potaſh are the ſame with thoſe of ammonia.

SULPHURET OF POTASH.

(1296.) Three parts of ſulphur and one of potaſh, being rubbed together in a glaſs mortar, they combine with heat, and form a green mixture of a garlic ſmell. The mixture attracts moiſture from the air, and is wholly ſoluble in water. A ſimilar combination may be made by heating two parts of ſulphur and one of potaſh in a crucible. They melt and combine, and the *ſulphuret of potaſh* formed ſhould be poured upon a marble ſlab to congeal. It ſhould then be broken in pieces and immediately put into a well corked phial.

(1297.) The ſulphuret of potaſh, prepared in this laſt manner, is of a brown colour reſembling the liver of animals; and was hence formerly called *hepar ſulphuris*, or *liver of ſulphur*. It is hard and brittle, with a vitreous fracture. Its taſte is cauſtic and bitter; its ſmell that of the vapour of ſulphur; and it leaves a brown ſtain upon the ſkin. Expoſed to the air it firſt becomes green, like the former preparation, and afterwards white. Expoſed to a violent heat, the ſulphur ſublimes, and leaves the alkali in a pure ſtate. It firſt changes vegetable blues to green, and then deſtroys them. When heated it diſſolves and combines with charcoal. In forming theſe ſulphurets, the carbonate of potaſh, or pearl-aſh may be employed, becauſe, during the proceſs, the carbonic acid is expelled.

(1298.) When expoſed to the air, or moiſtened with water, its colour becomes green, and it exhales ſulphureted hydrogen gas. The gas is formed by the decompoſition of water, and its formation changes the mixture into *hydrogureted ſulphuret of potaſh*, which is ſoluble in water, and is of a browniſh green colour. The *hydrogureted ſulphuret* may alſo be prepared by boiling two parts of potaſh, and one of ſulphur, in water. When expoſed to the air, the *hydrogureted ſulphuret* gradually attracts oxygen, and hence was employed by Mr Scheele as an eudiömeter, to aſcertain the proportion of oxygen gas in the atmoſphere. The hydrogureted ſulphuret being put into a graduated glaſs tube or jar, containing a meaſured quantity of air, over water or mercury, it attracts all the oxygen from the air, leaving nothing but azote, and the quantity of oxygen abſorbed is meaſured by the riſe of the water or mercury in the tube. The hydrogureted ſulphuret of potaſh oxidizes and diſſolves almoſt all the metals, and is ſuppoſed to have been the ſolvent by which Moſes rendered gold potable. (12.)

ACTION ON PHOSPHORUS.

(1299.) Potaſh does not act directly on phoſphorus, nor form any combination with that ſubſtance that is known. But by means of potaſh, phoſphorus is made to act upon and decompoſe water. When a ſolution of potaſh is heated over phoſphorus, in a retort, the phoſphorus decompoſes the water, and a part of it combining with the oxygen of the water, is converted into phoſphoric acid; while the remainder combining with the hydrogen of the water, is converted into phoſphureted hydrogen gas, which eſcapes in great quantity. This gas may be collected over water, and as ſoon as it mixes with the air, it takes fire. In this way the phoſphureted hydrogen gas was firſt obtained by Gengembre. (See 650, &c.)

(1300.) The combinations of potaſh with acids have long been diſtinguiſhed by the name of NEUTRAL SALTS; and ſometimes, by way of pre-eminence, they have been called *perfect neutrals*, becauſe few of them can be decompoſed by other ſubſtances.

I. SULPHATE OF POTASH.

(1301.) This ſalt has long been known, and has had many whimſical names affixed to it: ſuch as, *ſpecificum purgans*, *nitrum fixum*, *arcanum duplicatum*, *panacea holſatica*, *ſal de duobus*, *ſal polychreſtus*, &c. It has alſo been diſtinguiſhed by the names of *vitriol of potaſh*, *vitriolated tartar*, *vitriolated vegetable alkali*, &c. until in 1787, the

French chemiſts, in their new nomenclature, aſſigned it the name of *ſulphate of potaſh*.

(1302.) The ſulphuric acid is found to combine with potaſh in various proportions. When the acid and alkali mutually ſaturate each other, they conſtitute the *ſulphate* now under conſideration. This ſalt is not preſented by nature, but is formed by ſaturating a diluted ſolution of potaſh with ſulphuric acid, and then evapourating the ſolution until cryſtals appear.

(1303.) Its cryſtals vary according to the ſlowneſs or rapidity with which they are formed. They are commonly hexahedral pyramids, or ſhort hexangular priſms, terminated by one or more hexangular pyramids. It has a diſagreeably bitter taſte. Its ſpecific gravity is 2·4073. Water at 60° diſſolves $\frac{1}{16}$th of its weight of this ſalt, and boiling water $\frac{1}{5}$th of its weight. When boiled in water, nearly $\frac{1}{4}$th of its weight is diſſolved. It is not altered by expoſure to the air; it decrepitates on burning coals, and loſes its water of cryſtallization. In a red heat it melts, and loſes 1½ *per cent.* of its weight. It is ſometimes luminous in the dark, particularly after expoſure to light, or to a red heat.

(1304.) The analyſes that have been made of the component parts of this ſalt, differ conſiderably from each other; and we ſhall ſelect the following:—

	Dr Thomſon.	*Bergman.*	*Kirwan.*
Sulphuric acid,	39·7	40	45·2
Potaſh,	52·6	52	54·8
Water,	7·7	8	
	100·0	100	100·0

(1305.) This ſalt has never been applied to any uſe, except that it is employed as a purgative ſalt in medicine.

(1306.) The *ſuper-ſulphate*, or as it is ſometimes called the *acidulous ſulphate of potaſh*, and formerly *the vitriolated tartar with exceſs of acid*, is formed by heating in a retort three parts of ſulphate of potaſh, and one part of ſulphuric acid. It cryſtallizes in long ſlender needles, or in fix-ſided priſms. It has an acrid taſte, and reddens vegetable blues, thereby ſhewing that the acid is in exceſs. Water at 60° diſſolves $\frac{1}{7}$th of its weight of this ſalt. With heat it melts, and a long continued heat diſſipates the exceſs of acid, and converts it into ſulphate. There are ſeveral varieties of this ſalt, owing to its exceſs of acid being in different proportions; but as it has never been applied to any uſe, it does not ſeem neceſſary to enter into them.

II. Sulphite of Potash.

(1307.) This was long known by the name of *ſulphurous ſalt of Stahl*, who firſt diſcovered it, but its properties were more fully inveſtigated by Berthollet, Fourcroy, and Vauquelin.—It is formed by paſſing a ſtream of ſulphurous acid gas through a ſaturated ſolution of carbonate of potaſh, until efferveſcence ceaſes. The ſolution becomes hot, and depoſits cryſtals by cooling.

(1308.) The cryſtals are white and tranſparent rhomboidal plates; and are often in the form of ſmall needles diverging from a common centre. Their taſte is penetrating and ſulphureous; the ſpecific gravity 1·586. Cold water diſſolves its own weight of this ſalt, and boiling water a much greater proportion. Expoſed to the air it loſes part of its weight, and is ſlowly converted into ſulphate of potaſh. With heat it decrepitates, and firſt loſes water and part of its acid, then ſulphur is diſengaged, and there remains ſulphate of potaſh in which the alkali is ſlightly in exceſs. The nitric acid imparts oxygen, and converts it into ſulphate of potaſh; and likewiſe the oxymuriatic acid, though imperfectly. This ſalt decompoſes the oxides of ſeveral of the metals, and is itſelf decompoſed by charcoal at a red heat. The product is ſulphureted hydrogen gas, and carbonic acid; and there remains in the retort a hydrogenated ſulphuret of potaſh.

(1309.) Dr Thomſon aſcertained the conſtituents of this ſalt to be,

Sulphurous acid,	43·5,
Potaſh,	54·5,
Water,	2·0,
	100·0.

III. Nitrate of Potash.

(1310.) This ſalt, compoſed of nitric acid and potaſh, is commonly known by the names of *ſaltpetre*, or *nitre*. It has alſo been denominated *ſalt of nitre*, *nitre of potaſh*, or *nitrated potaſh*. Whether it was known to the Greeks and Romans is uncertain; for by the terms *nitrum* and *nitron*, Pliny ſeems to mean *ſoda*. It appears, however, that this ſalt, and its uſes in the conſtruction of fire-works, if not alſo in the formation of gunpowder for the purpoſes of war, were known to the Chineſe, and other eaſtern nations, from the earlieſt times. The firſt diſtinct mention of *nitre* in Europe, was by Roger Bacon in the 13th century.

(1311.) As this ſalt is of very extenſive uſe in chemiſtry and the arts, and is the chief inſtrument in deciding the quarrels of nations in the compoſition of gunpowder, it has attracted more than ordinary attention, and may well deſerve a full diſcuſſion.

(1312.) Nitrate of potaſh is formed in conſiderable quantities wherever animal and vegetable ſubſtances are expoſed to putrefaction, with acceſs of atmoſpheric air. The baſis moſt favourable for its formation is a mixture of putreſcent ſubſtances with lime and other earths; frequently moiſtened with urine and putrid water; expoſure to putrid exhalations; and an open, but not too free communication, with dry atmoſpheric air. This ſalt forms a frequent, and often an abundant effloreſcence, on the ſurface of the earth in India, in South America, in South Africa, and in ſome parts of Spain. In this country it is often ſeen forming a hoary effloreſcence or incruſtations on the walls of churches, of cellars, of ſtables, of privies, among the rubbiſh of old houſes, and other matters which are expoſed to putrid exhalations.

(1313.) In (558) it was ſtated that nitric acid is formed by the union of oxygen and azote; but no artificial proceſs is known by which they can be made to enter into chemical union, except by agitating them with the electric ſpark. It is ſuppoſed that when azote is in a naſcent ſtate, that it, is, at the inſtant of its being evolved from animal or vegetable ſubſtances, if it meets with oxygen gas it readily combines, and forms nitric acid, which is always firſt produced during the nitrification. But how the potaſh, the other ingredient in this ſalt, is formed, chemiſts are not agreed. It has not been detected in the original materials in which nitre is formed; and the only probable ſolution of the difficulty which can be adduced, is that which was ſtated at the commencement of this Diviſion,—That potaſh is a product of combuſtion, of which putrefaction is only a ſlower proceſs.

(1314.) This ſalt commonly cryſtallizes in ſix-ſided priſms. Sometimes, inſtead of ſix-ſided pyramids, the priſms are terminated by 18 facets, diſpoſed in three ranges of ſix, as if three truncated pyramids were piled upon each other. It ſometimes cryſtallizes in tables, and ſometimes forms an irregular maſs, which laſt for certain purpoſes is preferred, as it contains leſs water. Its ſpecific gravity, according to Dr Watſon, is 1·933; but according to Chaptal it is to that of water as 19·369 to 10·000.

(1315.) It is very brittle; and ſoluble in ſeven times its weight of water at 60°, and in rather leſs than its weight of water at 212°. Alcohol at 878 ſpecific gravity diſſolves $\frac{1}{100}$th part of its weight of this ſalt; but ſtronger alcohol does not act upon it. The taſte of this ſalt is ſharp, bitter, and cooling. It is not altered by expoſure to the atmoſphere. When its ſolution is boiled, part of the ſalt eſcapes with the water. With a ſtrong heat it melts, and by cooling congeals into an opaque maſs called *mineral cryſtal*. When it melts it begins to emit oxygen gas; and by keeping it in a red heat it yields about a third of its weight of this gas. At laſt it emits azotic gas; and if the heat be long enough continued, or raiſed to whiteneſs, the ſalt is wholly decompoſed, and pure potaſh remains behind.

(1316.) The following are the conſtituents of this ſalt, according to

	Bergman.	*Kirwan.*	*Richter.*
Nitric acid,	33	44·0	46·7
Potaſh,	49	51·8	53·3
Water,	18	4·2	
	100	100·0	100·0.

(1317.) The uſes of this ſalt are many and various. In medicine weak ſolutions of it are adminiſtred as a cooling, or *febrifuge* liquor; and as a diuretic to promote a more copious diſcharge of urine: though ſtrong doſes of it are dangerous. Small proportions of it are commonly mixed with ſea ſalt when uſed for the preſervation of fleſh-meat; and it always conveys to the meat a red colour. It is alſo uſed in dyeing; from it the nitric acid is extracted by the addition of ſulphuric acid; and a portion of it is burnt along with ſulphur in the manufacture of the ſulphuric acid, as already deſcribed. But the moſt important uſe of this ſalt is in the compoſition of gunpowder, and other preparations about to be deſcribed.

Manufacture of Nitre.

(1318.) It was already ſtated that this ſalt forms an effloreſcence in the ſoil in moſt of the warm countries. It forms more readily and abundantly on the northern than on the ſouthern expoſure of hills; and more in ſhady and ſheltered places, where the air is ſtagnant, than in thoſe which are expoſed to the burning rays of the ſun, and to ſweeping winds. Yet ſome degree of light, and change of air, ſeem neceſſary to its formation; for though it forms copiouſly in cellars; it is never found in deep caverns from which light is wholly excluded. In India this ſalt is manufactured by digging the ſoil in which it abounds, waſhing it with water, filtering, and cryſtallizing. Sometimes they operate upon the mud, and ſediment of tanks, or hollows into which the ſalt had been waſhed from the contiguous ſoil during the rainy ſeaſon, and where it is found cryſtallized, or mixed with mud, after the water has been much evapourated by the ſun's rays.

(1319.) In Sweden, in Pruſſia, and in various parts of Germany; in Ruſſia and in France, and various other countries, they conſtruct nitre-beds, and manage them with great art, with a view to the production of this ſalt. Theſe beds are compoſed of black vegetable mold, meadow-earth, ſcrapings of ſtreets, of ſtables, cellars, of lime, and the rubbiſh of old buildings, of dung, wet ſtraw, leaves, and all the putreſcent ſubſtances that can be procured, among which blood, and the garbage of the ſhambles are preferred. Theſe ſubſtances are mixed in alternate layers, in banks about 20 feet long, and from 6 to 7 in height, in the way our farmers make up compoſt dunghills. They are always placed in damp ſituations, ſheltered from the ſun; are put under a ſhed which is open towards the north, or are covered with a roof of ſtraw. Theſe beds are occaſionally moiſtened, and ſometimes turned for that purpoſe, during three years, with urine, foul water, the juice of dunghills, and the mother water of nitre, &c. and during the firſt year are ſprinkled once a month with ſlacked lime. All ſorts of weeds and green plants are mixed in the nitre-beds; and it is found that thoſe which are poiſonous, or which emit the moſt diſagreeable ſmell, are moſt productive of nitre; ſuch as hemlock, tobacco, henbane, cabbage, horehound, &c. The beds yield nitre from one to ten years, and what effloreſces upon the ſurface is occaſionally ſwept off with brooms. The nitre which forms among dung, and putreſcent ſubſtances, is *nitrate of potaſh*, and what forms among lime is *nitrate of lime;* and the latter is decompoſed by the occaſional addition of leys of wood-aſhes.

(1320.) The reſiduum of the nitre beds makes excellent manure after all the nitre is extracted, and this ſhews the fallacy of the theory which ſuppoſed nitre to be the food of plants.—It is true a ſoil is very fertile which is ſtored with ſuch quantities of putreſcent ſubſtances, and of calcareous earth, as to be favourable for the formation of nitre; but in all caſes where this ſalt has been mixed in a ſoil in ſuch quantity as ſenſibly to affect the plants, it has been found to operate as a poiſon, and not as a nouriſhment.

(1321.) The nitre is lixiviated, or waſhed from the earthy compoſt in the nitre bed, by putting the earth into ſtone troughs, or wooden caſks, which have a ſmall hole in the bottom in which is inſerted a funnel cloſed with a wooden peg. The caſk being nearly filled with earth, water is poured in till it riſes above the earth, and is allowed to ſettle ſeveral hours. After which the wooden peg is drawn out, and a bunch of ſtraw, at the bottom of the caſk, ſerves the purpoſe of a filter, to keep back the earth, while it allows the ſaline ſolution to run into a large ſhallow tub ſituated below the caſk.

(1322.) In order to obtain a ſtronger ley, the ſame water is ſucceſſively poured upon three different parcels of earth, one of which has been twice lixiviated, the other once, and the third has not undergone this proceſs. To precipitate the nitrate of lime in the maſs, ſome add leys of potaſh, or of wood aſhes, to the original heap; ſome place a ſtratum of theſe ſubſtances at the bottom of the lixiviating caſks; and ſome boil the liquor with theſe ſubſtances after the lixiviation is completed In place of potaſh, or aſhes, ſome uſe ſulphate of potaſh, which forms nitrate of potaſh and ſulphate of lime, by double decompoſition.

(1323.) The lixivium thus obtained is boiled in a copper veſſel, with occaſional additions of new liquor, until it be concentrated to the point of cryſtallization. The liquor is then run into a ſeparate veſſel, where it cryſtallizes by cooling. What does not cryſtallize is called *the mother water*, and it is drawn off from the cryſtals, and poured back among new lixivium. The ſea ſalt in the lixivium is ſkimmed off, during the ebullition, by a laddle, and put into a baſket over the cauldron to drain.

(1324.) The cryſtals thus obtained are called *crude nitre*, or *ſaltpetre of the firſt boiling*, as they contain other ſalts, and ſeveral impurities. To get rid of theſe, they are ſubjected to two ſucceſſive ſolutions and cryſtallizations. The ſolutions are performed in the copper cauldron; the ſea-ſalt is removed as faſt as it conſolidates; and extraneous impurities are removed by pouring in a diſtended ſolution of glue, or whites of eggs, which raiſes a ſcum to the ſurface, where it is ſkimmed off as faſt as it riſes. The cryſtallizations are performed in a covered copper veſſel, into which the purified liquor is run, and allowed to remain without diſturbance during four or five days. The ſecond cryſtallization is called *ſaltpetre of the ſecond boiling*; and the third is called *ſaltpetre of the third boiling*. It is placed upon a declivity to drain, and dry by expoſure to the air, and is then fit for the manufacture of gunpowder.

(1325.) During the French revolution Meſſrs Beaumé and Carny, contrived to facilitate the purification of nitre. They obſerved that common ſalt, the muriates of lime and magneſia, and other marine ſalts in the nitre-liquor, are nearly as ſoluble in cold as in warm water, which is not the caſe with nitre. Having reduced the crude nitre, or *ſaltpetre of the firſt boiling*, to ſmall particles by mallets, 20 per cent. of cold water was added to it, the mixture ſtirred, and left during ſix or ſeven hours. This water was now drawn off, and ten per cent. of new water added to the ſame ſaltpetre, and allowed to remain one hour. This being drawn off, five per cent. of new water was added, and the ſalt laid on an inclined plain, or into a baſket, to drain. The nitre is now diſſolved in a cauldron, and being boiled down to the cryſtallizing point, is let into leaden veſſels to cryſtallize. The cryſtallization is diſturbed, by raking it aſide as it forms, and throwing it by laddles into draining baſkets over the veſſel. In this way it forms ſmall ſpicular cryſtals, which are more eaſily dried than large maſſes. Theſe cryſtals are thrown into a vat with a double bottom, the upper one bored full of ſmall holes, to drain. They dry ſo readily that they may be applied to uſe in a few hours; or if the weather be unfavourable, they are dried by a ſtove.

(1326.) The manufacture of nitre has long been eſtabliſhed in France; but the old government, truſting to ſupplies from their Eaſt India Company, the home manufacture was allowed to languiſh, and produced very little. When the revolution broke out, had it not been for the vigour with which they ſet about this manufacture, and the improvements ſuggeſted by their ſcientific men, as their intercourſe with India was cut off, they would infallibly have been ſubdued. In this country only one feeble, and ill directed attempt was made to eſtabliſh this manufacture, in the diſſipated reign of Charles II. Our government truſts entirely to our India Company for a ſupply of this important article. Thoſe who watch over our national ſafety do not ſeem to be aware, that if any accident ſhould drive us out of India, we would ſoon be unable to fire a ſhot in our own defence.—It is for theſe reaſons we have entered the more minutely into the modes of preparing this ſalt; becauſe they can be executed in Britain as well as in any other country.

GUNPOWDER.

(1327.) This is formed of an intimate mixture of nitre, charcoal, and ſulphur. Chaptal found that very ſtrong gunpowder might be formed of nitre and charcoal alone; but it has not ſufficient conſiſtency, and does not endure carriage. The charcoal of white wood, ſuch as poplar, willow, birch, hazel, &c. anſwers beſt for the purpoſe, and that made from young ſhoots or branches, only two or three years growth. That which is made in trenches, under the ſurface, anſwers better than that which is made above ground; and the charcoal ſhould be uſed immediately after it is made, to prevent its abſorbing moiſture and air. The materials are commonly reduced to fine powder ſeparately, and afterwards incorporated by wooden peſtles wrought by machinery.

(1328.) The proportion of the ingredients is varied according to the purpoſes to which the powder is to be applied. According to Chaptal, the proportions moſt generally employed are

76 Saltpetre,
12 Charcoal,
12 Sulphur.

But according to the ſame author, the beſt gunpowder is compoſed of

77 Saltpetre,
14 Charcoal,
9 Sulphur.

Which does not differ much from the proportion laid down by Dr Thomſon, and other authors in this country, namely

96 parts nitre,
15 Charcoal,
9 Sulphur.
——
100

(1329.) Theſe ingredients are firſt reduced to fine powder ſeparately. They are then mixed in due proportion, and intimately incorporated by wooden peſtles beating them in wooden baſons: during which they are kept moiſt. They are then formed into a thick paſte with water, and forced through a ſort of ſieve, the ſize of whoſe holes determines the ſize of the grains. This is called *granulating* the powder. After the grains are dried, they are put into barrels which are moved rapidly round their axes. This rubs off aſperities from the grains, and gives them a ſmooth ſurface, which is called *glazing*. The glazing renders the powder leſs apt to imbibe moiſture; but it alſo renders its combuſtion leſs rapid. Cannon powder is not glazed.

(1330.) The French not only improved the proceſs of purifying nitre, but alſo the manufacture of gunpowder, ſo much that in the ſpace of a few months 16,000,000 lbs. of nitre were produced in France, and the powder works of Grenelle alone fabricated 34,000 lbs. of gunpowder daily. Their principal improvements were, that in place of mixing the materials by means of heavy peſtles, moved by machinery, they effected this purpoſe by means of bronze mill-ſtones, moving rapidly round in troughs, into which the materials are put in due proportions. The ſulphur requires to be previouſly reduced to fine powder; which is not ſo neceſſary for the nitre and charcoal, as they grind, at the ſame time they are mixed, by the rotatory motion of the mill-ſtones. The materials are well dried before they are ſubjected to this operation, and are then paſſed through fine ſieves, moved by the ſame machinery with the mill-ſtones. To produce a ſtill more perfect grinding and mixture, the powder is now put into ſtrong caſks of oak-plank, which have ledges or mouldings on their inſide, ſimilar to thoſe of a barrel churn. Theſe caſks are mounted upon iron axles, which are covered with wood; about 75 lbs. of the compoſition is put in at a time, and 80 lbs. of bronze in ſmall balls, about 4 lines in diameter. The caſk being now put into very rapid motion by means of machinery, the colliſion of the balls, and the violent agitation of the compoſition, ſoon effects its complete trituration and mixture. The compoſition is known to be ſufficiently pulverized when a little of it being ſpread on a pallet with a ſmooth knife, no ſigns of roughneſs appear. The compoſition is now brought to a proper conſiſtence by adding a little water; and is compreſſed into hard cakes in moulds of walnut wood, by means of a ſcrewed preſs. Theſe cakes are removed to the drying houſe, dried, broken in pieces, and granulated.

(1331.) It is probable the granulation of gunpowder may be found to be an unneceſſary proceſs, and that it may be compreſſed in wooden moulds into ſolid cylinders, of ſize and diameter adapted to the calibre of every gun in which it is to be uſed. This is likely to render its exploſion much more rapid and vigorous, for, in granulated powder, ſome time is loſt by the ſlow progreſs of the inflammation from one grain to another. Hence granulated powder inflames ſlowly during its progreſs along the tube, as it is impelled by the elaſtic force of what was firſt inflamed next the breach; and much of it is thrown from the muzzle without being inflamed at all.—It ſeems only neceſſary to add that if artificial heat be neceſſary for the drying houſes of powder works, in our damp climate, this ſhould be procured from ſteam, conveyed in tin, copper, or leaden tubes, from a boiler ſituated in a ſeparate building. It is very dangerous to expoſe this compoſition to a heat exceeding 212°; and no iron or flint ſhould come in contact with it.

(1332.) The ingredients which enter into the compoſition of gunpowder, may enable us to comprehend the cauſe of the violent exploſion which takes place when an ignited body is applied to it. It burns in vacuo as well as in the open air; and during its combuſtion, a vaſt quantity of gas is ſuddenly let looſe, which is the cauſe of its violent effects. The nitre is decompoſed by the charcoal and ſulphur, and carbonic acid gas, azotic gas, ſulphurous acid gas, and probably ſulphureted hydrogen gas, are formed. Theſe gaſes have their elaſticity prodigiouſly increaſed in conſequence of the high temperature, a *white heat*, which takes place at the inſtant of their formation. Mr Cruikſhanks renders it probable that no ſenſible quantity of water is formed. The reſiduum after the combuſtion of gunpowder, is unconſumed charcoal; potaſh combined with a ſmall portion of carbonic acid; ſulphate of potaſh; and a very ſmall proportion of the ſulphuret of potaſh. The laſt ingredient acts powerfully on metals, and hence guns ſhould be well cleaned immediately after they are uſed, to prevent their corroſion. This laſt reſiduum alſo conveys to the cleaning of guns the ſmell of rotten eggs. The whole reſiduum powerfully attracts moiſture.

FULMINATING POWDER.

(1333.) This is prepared by mixing, or rubbing, in a warm mortar, three parts of nitre, two parts of potaſh, and one part of ſulphur, all previouſly well dried. The ingredients do not require ſo intimate an incorporation as thoſe of gunpowder; but they ſhould be previouſly dried and pulveriſed ſeparately, and the more intimately they can be mixed the better.

(1334.) When a lighted match is applied to this compoſition, or when it is thrown upon burning coals, it only deflagrates ſlowly. But when a few grains of it are put into an iron ſpoon, and ſlowly heated on a candle, or on the fire, it firſt begins to melt, and then acquires a dark colour. Soon ſtreaks of white lambent flame appear upon its ſurface, when it explodes with terrible violence. It appears that the whole of its ſubſtance is ſuddenly converted into gas, at a high point of ignition. The nature of theſe gaſes has not been accurately examined; but they are ſuppoſed to be ſulphureted hydrogen gas, azotic gas, with a probable mixture of ſulphurous acid gas.

(1335.) It is to the inſtantaneous extrication of theſe gaſes, and their ſudden impulſe on the ſurrounding air, that the loud report of theſe fulminating

nating preparations is aſcribed. Their effects do not extend to any great diſtance, but it is the opinion of ſome, that were a few pounds of this, or any other equally powerful compoſition, to be fulminated cloſe to the walls of a fortified city or caſtle, it would excite ſuch a convulſion in the air as to throw them to the ground.—War never will ſtop until it can be made utterly deſtructive to both the parties engaged. Were two individuals who are going to fight a duel, mathematically certain it would end in the deſtruction of both, they would compromiſe their difference, and ſhake hands.

(1336.) When the mixture is made with equal parts of nitre and ſolid ſulphuret of potaſh, the detonation is more rapid, but the exploſion is leſs violent.

POWDER *of* FUSION.

(1337.) Is compoſed of three parts of nitre, one of ſulphur, and one of ſaw-duſt, well mixed. A little of this powder, with a thin plate of copper rolled up, being put into a walnut ſhell, and ſet on fire, the powder deflagrates rapidly, melts and converts the copper into a ſulphuret, without any injury to the ſhell.

WHITE *and* BLACK FLUX.

(1338.) A mixture of equal parts of tartar and nitre, deflagrated by a crucible in charcoal, is known by the name of *white flux*, from its white colour. It is merely carbonate of potaſh, mixed with a little pure potaſh.—When two parts of tartar, and one of nitre are deflagrated in the ſame way, a portion of the charcoal remains unconſumed, and gives to the reſidue a black colour, and it is hence called *black flux*. It is merely a compound of carbonate of potaſh and charcoal. Theſe fluxes are much uſed in metallurgy, and the fuſion of metals.

IV. NITRITE *of* POTASH.

(1339.) This was firſt obſerved by Bergman and Scheele, and cannot be formed by uniting the nitrous acid directly with potaſh. But if a ſmall retort be filled with nitre, and kept red-hot for about half an hour, a conſiderable portion of oxygen gas is extricated, and the ſalt which remains conſiſts of nitrous acid, having an under proportion of oxygen, united to potaſh.—This ſalt changes vegetable blues into green. It is deliqueſcent, and attracts moiſture from the air. By long expoſure it alſo reabſorbs oxygen, and returns to its original ſtate of nitrate of potaſh. It is very ſoluble in water; its taſte is cooling, but more acrid than that of the nitrate. It precipitates gold from its ſolutions in the metallic ſtate, becauſe the nitrous acid in its compoſition has a ſtronger attraction for oxygen than gold.

V. MURIATE *of* POTASH.

(1340.) This was formerly called *febrifuge*, or *digeſtive ſalt of ſylvius*, and *regenerated ſea-ſalt*. Bergman named it *ſalited vegetable alkali*.—It may be obtained by ſaturating potaſh with muriatic acid, and evaporating the ſolution until a pellicle appears on its ſurface when the ſalt cryſtallizes by cooling, but the moſt regular cryſtals are obtained by ſlow evaporation. It is commonly obtained during other chemical proceſſes.

(1341.) Its cryſtals are irregular cubes. It has a diſagreeable bitter taſte. Specific gravity 1·856. It diſſolves in three parts of cold water, and in 1·7 times its weight of boiling water. In a damp atmoſphere it attracts moiſture; but becomes dry again in dry air.

(1342.) When heated it decrepitates; melts at a red heat, and at laſt evaporates in white ſmoke unchanged. In a red heat it loſes 2·86 *per cent.* of its weight, which is ſuppoſed owing to the expulſion of water, and perhaps alſo of a ſmall portion of its muriatic acid. Various analyſes have been made of this ſalt; but as they differ conſiderably from each other, we ſhall only preſent thoſe of

	Bergman	*Wenzel.*
Muriatic acid,	31	35
Potaſh,	61	65
Water,	8	
	100	100

(1343.) This ſalt is decompoſed by the ſulphuric and nitric acids. With one part of nitric acid, and two of the muriate of potaſh, a *nitro-muriatic acid*, or *aqua regia* is formed.—This ſalt was formerly much uſed in medicine, as its former names import; but it is now abandoned. It has been recommended for precipitating nitrate of lime, in the manufacture of nitre; and for effecting the cryſtallization of alum.

VI. HYPEROXYMURIATE *of* POTASH.

(1344.) This ſingular ſalt was firſt formed by Dr Higgins, and ſoon after by Berthollet. Its properties were examined by Lavoiſier, Dolfuz, Van Mons, Fourcroy, Vauquelin, Hoyle, Chenevix, and other chemiſts.

(1345.) In (778) we explained the method of forming the oxymuriatic acid. The ſalt under conſideration is formed by paſſing a ſtream of oxymuriatic acid gas through a ſolution of potaſh. For this purpoſe one part of carbonate of potaſh is uſually diſſolved in ſix parts of water. The ſolution is put into a Wolfe's bottle, and the ſtream of oxymuriatic acid is continued until the potaſh be ſaturated. It was ſtated (772) that during this proceſs part of the muriatic acid became ſurcharged with oxygen gas and formed the *hyperoxymuriate of potaſh*, while the remainder formed the common muriate of potaſh, the ſalt laſt deſcribed. Theſe ſalts may be ſeparated by diſſolving the whole in boiling water, after which the hyperoxymuriate readily cryſtallizes by cooling, and the cryſtals are dried between folds of blotting paper. When the cooling is rapid, the cryſtals are ſmall thin plates, of a ſilvery whiteneſs. But if the cooling be very ſlow, or if the cryſtals be obtained from a cold ſolution by ſpontaneous evaporation, they are large, and of a regular rhomboidal figure.

(1346.) The taſte of this ſalt is ſomewhat analogous to that of nitre. Its ſpecific gravity is 1·989. By ſmart friction it crackles, and emits ſparks of fire. It is ſoluble in 2½ parts of boiling water, and in 16 parts of water at 60°. It is not altered by expoſure to the air. When heated it melts in its water of compoſition; and at a red heat, it emits more than a third of its weight of oxygen gas. When the emiſſion of gas ceaſes, it is found to be converted into common muriate of potaſh. This ſalt yields the pureſt oxygen gas of any that can be obtained.

(1347.) The conſtituents of this ſalt, according to Fourcroy, are

Muriate of potaſh,	67
Oxygen, - - -	33
	100

But according to Chenevix its conſtituents are

Hyperoxymuriatic acid,	58·3
Potaſh, - - - - - - -	39·2
Water, - - - - - -	2·5
	100·0

Action *of* Combuſtibles.

(1348.) This ſalt is decompoſed by heat, and frequently with fulmination, by all the known combuſtibles.

(1349.) Three parts of this ſalt and one of ſulphur, being rubbed in a mortar, or laid on an anvil and ſtruck with a hammer, fulminate violently. This mixture is ſaid ſometimes to detonate ſpontaneouſly, and therefore ſhould not be made, or kept, in large quantities. But we have kept conſiderable quantities of it during a long period, and though it was ſometimes ſubjected to conſiderable friction and percuſſion, it did not explode. With violent friction or percuſſion it fulminates; but when a lighted match is applied, it burns like gunpowder. When mixed with charcoal, in the ſame proportion, it exhibits the ſame effects, tho' not ſo violent. With phoſphorus it fulminates violently, both by friction and percuſſion. Not more than half a grain, or at moſt a grain, of the ſalt ſhould be exploded at a time, otherwiſe the effects may prove dangerous. It alſo detonates with moſt of the metals, when mixed with their filings, and the mixture rubbed in a mortar, or ſtruck with a hammer. If a ſmall quantity of this ſalt be wrapped in a ſlip of tin-foil, and ſmartly ſtruck with a hammer, it detonates violently. When thrown upon the ſurface of platinum, at a white heat, it is ſublimed, but oxygenates the ſurface of the metal. It likewiſe explodes with cinnabar, pyrites, ſugar, gums, oils, reſins, alcohol, &c. If a ſlip of cotton cloth be dipped in a ſolution of this ſalt, and be afterwards well dried, and rubbed in a mortar, it emits flaſhes of fire, with exploſions ſimilar to the cracking of whips. If the cloth be very dry and warm, it takes fire. It alſo takes fire when a little ſulphuric acid is poured upon the cloth.

(1350.) Three parts of this ſalt and one part of a mixture conſiſting of equal parts of charcoal and ſulphur, exhibit more violent fulminations by friction and percuſſion, and a brighter flame than any of the foregoing preparations. But when a lighted match is applied, this compoſition detonates in the ſame manner as gun-powder. Berthollet obſerved that this ſalt is more powerful than nitre, and hence attempted to make it the baſis of gunpowder. But when it was tried on a large ſcale at Eſſone, in 1788, a great quantity of it exploded, and among other miſchiefs killed M. le Tors, and Mademoiſelle Chevraud; which put an end to all attempts to produce that intimate incorporation of the materials, which is neceſſary for gunpowder.

(1351.) But this mixture has lately been introduced with ſucceſs, or the ſalt itſelf, or with a very ſmall mixture of ſulphur or of charcoal, to ſerve inſtead of priming for muſquets, and it might alſo be applied to camons. For this purpoſe the material is lodged in a ſmall chamber in the lock of the piece, and a cylinder, which turns by a ſmall lever, has a ſmall hollow in it, adapted to receive a minute portion of the mixture. On turning round the lever to the proper poſition, the hollow in the cylinder communicates, by a ſmall opening, with the gunpowder in the chamber of the piece. The advantage of this mode of firing guns is, that it is inſtantaneous, and none of the gas is loſt by eſcaping at the touch-hole.

(1352.) It has been propoſed to employ this ſalt in exciting ſubmarine exploſions, and in generating inflammation in other engines of war, applicable to various purpoſes; but which we cannot enter upon at preſent.—As this ſalt cannot bear the trituration neceſſary to its due incorporation with charcoal and ſulphur, in order to make gunpowder, it has been propoſed by ſome to mix theſe with the ſalt in its liquid form, and evaporate to dryneſs with conſtant agitation. It is alſo thought that *fulminating ſhot* might be made by encloſing a looſe mixture of theſe materials in a ball of ſoft lead and plugging up the hole. That when this ſhot was fired from a great gun, the agitation in paſſing through the air would ſufficiently mix the materials to make them act with effect. That when the ball ſtruck a fortification, or the ſide of a ſhip, it would be bruiſed flat, or ſqueezed through a ſmall hole, and thus expoſe its contents to ſuch violent friction and percuſſion as to make them fulminate vigorouſly. It is thought the effect of ſuch fulmination would be to tear any obſtacle to ſhivers. The ſame effect would enſue from a bomb of ſoft lead filled with ſuch a mixture.

(1353.) The cauſe of the fulmination of this ſalt with combuſtible bodies, was firſt explained by Berthollet. The oxygen in the compoſition of the ſalt combines with the combuſtible, forming the carbonic and other gaſes, which ſuddenly ſpring from a ſolid to an elaſtic ſtate; and the friction, or percuſſion, only brings the bodies within the ſphere of each other's attraction.—We formerly ſtated the heat and light emitted during this and other exploſions, to be inconſiſtent with received theories concerning their latency, or combination.

Action *of* Acids.

(1354.) Concentrated ſulphuric acid acts with ſuch violence upon this ſalt, that it is neceſſary to operate with ſmall quantities. When this acid is poured upon the ſalt, it explodes, ſometimes with a red flame. If the ſalt be mixed with charcoal, ſugar, or any combuſtible body, and have ſulphuric acid dropped upon it, the mixture takes fire, and burns with a very brilliant flame. When nitric acid is poured upon a mixture of this ſalt and phoſphorus, the mixture emits flaſhes of fire during a long period. The muriatic acid diſengages the hyperoxymuriatic acid from its alkaline baſis, but with its properties conſiderably changed. It more readily combines with water than before its union with the alkali. A ſlip of paper dipped in ether, being introduced into a jar filled with this gas, explodes, and depoſites charcoal. A feather, moiſtened with oil of turpentine, being introduced into the jar, takes fire, and burns with a red flame, while it emits a great quantity of black ſmoke.—Some of the concentrated vegetable acids are alſo ſaid to produce inflammation, or exploſion, when poured upon this ſalt; but the particulars have not been accurately examined.

(1355.) This ſalt was, at its firſt diſcovery, uſed as a bleaching ingredient, but Mr Tennant at Glaſgow having diſcovered lime to be a much preferable vehicle for the oxymuriatic acid, when applied in bleaching, the uſe of this ſalt is now generally diſcontinued.

VII. Fluate *of* Potash.

(1356.) This ſalt was firſt formed by Scheele in 1771.—It may be formed by uniting the fluoric acid with potaſh, or by fuſing in a platinum crucible a mixture of fluor ſpar and carbonate of potaſh. By digeſting the maſs in water the fluate of potaſh is obtained in ſolution.—It does not cryſtallize by evaporation, but forms a gelatinous maſs, which attracts moiſture from the air. By heat this ſalt combines readily with ſilica. It contains a portion of ſilica in its compoſition, and when this is ſeparated, Wenzel ſays the fluate of potaſh forms cryſtals. This ſalt has not been applied to any uſe.

VIII. Borate *of* Potash.

(1357.) This ſalt ſeems to be analogous to common borax, and it may be formed by calcining a mixture of the boracic acid and nitre. The heat expels the nitric acid, and the boracic acid combines with the alkaline baſe. Or it may be formed by directly combining the boracic acid with potaſh. There are two varieties of it. One when the two ingredients mutually ſaturate each other; and one where the alkali is in exceſs. This is called a *ſub-borate*. It cryſtallizes from ſolution in water into four-ſided priſms.

IX. Phosphate *of* Potash.

(1358.) Of this there are two varieties, one in which the acid is in exceſs, and one in which the ingredients ſaturate each other.

(1359.) *The ſuperphoſphate of potaſh* is formed by dropping a ſolution of carbonate of potaſh into phoſphoric acid until effervеſcence ceaſes. This ſalt does not cryſtallize, but becomes gelatinous by evaporation. When dry its ſpecific gravity is 2·8516 When heated it firſt melts in its water of compoſition, then becomes dry, and laſtly is converted into a tranſparent glaſs. It is decompoſed by the ſulphuric, nitric, and muriatic acids; and has been applied to no uſe.

(1360.) *The phoſphate of potaſh*, or the ſaturated ſalt, is obtained by expoſing a mixture of pure alkali and the former combination, to a ſtrong heat. In this caſe the potaſh combines with the phoſphoric acid to the point of ſaturation.—This ſalt is ſcarcely ſoluble in cold, but is ſoluble in hot water, and as it cools it drops in the form of a white powder. It has not been applied to any uſe.

X. Phosphite *of* Potash.

(1361.) Is formed by diſſolving carbonate of potaſh in phoſphorous acid. This ſalt is very ſoluble in water, and cryſtallizes in four-ſided rectangular priſms, with dihedral ſummits.

XI. Carbonate *of* Potash.

(1362.) This ſalt has been long known, but its properties were not underſtood until they were illuſtrated by Dr Black. It has paſſed under various names, as *potaſh, fixed nitre, vegetable alkali,* &c.—There are two varieties of this ſalt. The firſt is when the alkali is fully ſaturated with carbonic acid. The ſecond is the carbonate of commerce, in which the alkali is always in exceſs.

(1363.) The *ſaturated carbonate* may be obtained by diſſolving potaſh in water, and paſſing thro' it a ſtream of carbonic acid gas, obtained from chalk by means of ſulphuric acid, or from fermenting beer, until the potaſh refuſes to abſorb any more. Or if the potaſh be diſtilled with ſolid carbonate of ammonia, the ammonia eſcapes in the form of a gas, and leaves its carbonic acid in union with the potaſh. During the ſaturation of potaſh with carbonic acid, it always depoſits a quantity of ſilica, and Pelletier propoſes this as a method of purifying potaſh from that earth.—This ſalt cryſtallizes in quadrangular priſms, or in tetrahedral rhomboidal priſms, with dihedral ſummits. The perfect cryſtals have eight faces, two hexagons, two rectangles, and four rhombs. Their taſte is alkaline but not corroſive, and they ſtill change vegetable blues into a green. They are ſoluble in four times their weight of cold water, and in one ſixth of their weight of boiling water. They are ſcarcely ſoluble in alcohol, even when aided by heat. During their ſolution in boiling water, a portion of the carbonic acid eſcapes in the form of bubbles. Their ſpecific gravity is 2·012 Heat expels part of the water and carbonic acid, but does not entirely decompoſe this ſalt. The cryſtals are not altered by expoſure to the air. The carbonic acid eſcapes from potaſh when it is heated with ſulphur, or when any other acid whatever acts upon the compound; and this is the cauſe of the effervеſcence which takes place when acids are poured upon the carbonates of potaſh.

(1364.) The conſtituents of this ſalt are, according to

	Bergman.	*Richter.*	*Kirwan.*	*Pelletier.*
Carbonic acid,	20	26·5	43	43
Potaſh,	48	73·5	40	41
Water,	32		17	16
	100	100·0	100	100

As Kirwan and Pelletier nearly agree, their analyſis is moſt likely to be exact.

(1365.) The *carbonate of commerce*, called alſo *ſubcarbonate*, contains various proportions of the carbonic acid, and alſo a mixture of various foreign ſubſtances.—A pure *ſubcarbonate* may be formed,

formed by ſubjecting the former ſalt to a red heat in a ſilver or platinum veſſel. This expels a portion of the carbonic acid, and the ſalt now acts with more energy on animal and vegetable ſubſtances. Expoſed to the air it deliqueſces, and aſſumes the conſiſtency of oil. It does not ſenſibly abſorb carbonic acid from the air.

(1366.) The carbonate of commerce contains various extraneous ſubſtances, and Mr Kirwan propoſed to aſcertain the proportion of pure alkali it contained, by the quantity of alumina which a given weight of it could precipitate from alum. Vauquelin propoſed to accompliſh the ſame object by the quantity of nitric acid, of a given denſity, neceſſary to ſaturate a given weight of the ſalt.—But there is generally ſome portion of lime and magneſia preſent in the carbonates of commerce, which muſt throw a degree of uncertainty on the reſult of ſuch experiments. However, the component ingredients of various carbonates of commerce, according to Vauquelin's experiments, are exhibited in the following

TABLE.

	Potaſh.	Sulphate of potaſh.	Muriate of potaſh.	Inſoluble reſidue.	Carbonic acid and water.	Total.
Potaſh of Ruſſia	772	65	5	56	254	1152
——— America	857	154	20	2	119	1152
American Pearl-aſh	754	80	4	6	308	1152
Potaſh of Treves	720	165	44	24	199	1152
——— Dantzic	603	152	14	79	304	1152
——— Voſges	444	148	510	34	304	1440

XII. ARSENIATE *of* POTASH.

(1367.) Arſenic acid combines with potaſh in two proportions. The firſt forms *arſeniate*, and the ſecond *ſuper-arſeniate of potaſh*.—The arſeniate deliqueſces in the air, and cannot be cryſtallized. When heated it partly melts into a white glaſs, and is partly melted into a ſuper-arſeniate. Mixed with one eight of its weight of charcoal powder, and diſtilled in a retort, it ſwells and bubbles violently, owing to the diſengagement of carbonic acid gas; and at the ſame time a portion of arſenic is ſublimed. There remains carbonate of potaſh and charcoal.

(1368.) Macquer firſt obtained the *ſuper-arſeniate of potaſh*, by diſtilling equal parts of white oxide arſenic and nitre; and hence it was called *arſenical ſalt of Macquer*. The white ſaline maſs which remains in the retort, being diſſolved in hot water, filtered, and evaporated to a pellicle, depoſits beautiful cryſtals of *ſuper-arſeniate of potaſh*, Scheele alſo formed this ſalt by adding arſenic acid to the arſeniate of potaſh, until it reddened vegetable blues. It cryſtallizes in four-ſided priſms, terminated by four-ſided pyramids. This ſalt is not decompoſed by ſalts which have a baſis of lime or magneſia, as takes place with the arſeniate of potaſh.

XIII. TUNGSTATE *of* POTASH.
XIV. MOLYBDATE *of* POTASH.
XV. CHROMATE *of* POTASH.
XVI. COLUMBATE *of* POTASH.

(1369.) We deem it unneceſſary to enter into a deſcription of theſe ſalts, as they never have been applied to any uſe.

XVII. ACETATE *of* POTASH.

(1370.) This ſalt, having been much employed in medicine, has received a great variety of whimſical names, ſuch as *arcanum tartari*, *ſecret foliated earth of tartar*, *eſſential ſalt of wine*, *regenerated tartar*, *diuretic ſalt*, *digeſtive ſalt of Sylvius*, &c. It is uſually prepared by ſaturating carbonate of potaſh with diſtilled vinegar, and evaporating to dryneſs in a moderate heat. If the heat be too great the acid is decompoſed. It is commonly preſented in ſmall white plates; but it may be made to cryſtallize in priſmatic cryſtals.

(1371.) It is ſoluble in nearly its own weight of cold water, and is alſo ſoluble in alcohol. It attracts moiſture from the air, unleſs it has been cryſtallized by very ſlow evaporation. It melts when heated, and if the heat be raiſed, the acid is decompoſed. There paſſes into the receiver a liquid containing vol. alkali and pruſſic acid: which have led to a ſuſpicion that azote is one of the conſtituents of acetic acid. There remains in the retort charcoal mixed with carbonate and pruſſiate of potaſh. Diſtilled along with white oxide of arſenic, it emits white ſmoke of a moſt offenſive odour, which takes fire when it comes in contact with air. This ſalt is decompoſed by the ſtrong acids, and diſtilled with ſulphuric acid, it yields highly concentrated acetic acid.—Its conſtituents are, according to

	Higgins.	*Richter.*	*Wenzel.*
Acetic acid and water,	38·5	47·98	49·85
Potaſh,	61·5	52.02	50·15
	100·0	100 00	100·00

XVIII. OXALATE *of* POTASH.

(1372.) This ſalt exiſts in the ſtate of *Oxalate* and *Superoxalate*.—The *oxalate* is formed by ſaturating potaſh with oxalic acid. This ſalt does not readily cryſtallize unleſs one of the ingredients be ſlightly in exceſs. When this is the caſe it forms ſix-ſided priſms, not unlike the cryſtals of oxalic acid.

(1373.) The *ſuperoxalate* contains the oxalic acid in exceſs. It may be formed by dropping, very gradually, a ſolution of potaſh into a ſaturated ſolution of oxalic acid in water. When the proper quantity of alkali is added, no precipitation takes place. It is ſoluble in about ten times its weight of boiling water, but ſcarcely ſoluble in cold water. Its cryſtals are ſmall opaque parallelopipeds, not altered by expoſure to the air. Its taſte is ſharp, and acid, with a degree of bitter. By heat the acid in theſe ſalts is deſtroyed.

(1374.) This ſalt exiſts, ready formed, in *oxalis* *acetocella*, or wood ſorrel, and in the *rumex acetoſa*, from which it is extracted in many parts of Europe, in great quantities, by bruiſing the plants, boiling, filtering, evaporating, and cryſtallizing. Hence it is called the *ſalt of wood ſorrel*, and in this country is often called *eſſential ſalt of lemons*. It is uſed for removing ſtains from linen, and for various purpoſes of the arts.—This ſalt combines with moſt of the alkalies and earths, forming triple ſalts which have not been accurately examined.

XIX. Tartrate *of* Potash.

(1375.) This ſalt is alſo either a *tartrate*, or *ſupertartrate*.—The *tartrate* has alſo obtained the names of *ſoluble tartar*, and *vegetable ſalt*. It is formed by adding tartar, or cream of tartar, in powder, to a hot ſolution of carbonate of potaſh, until effervescence ceaſes. The ſolution muſt be boiled ſome time, filtered, and evaporated until a pellicle appears on the ſurface; when, by ſlow cooling, it depoſits cryſtals, which are long rectangular priſms, terminated by two ſided ſummits. This ſalt has a bitter taſte; its ſpecific gravity is 1·5567. It is ſoluble in its own weight of cold, and ſtill more ſoluble in hot water. When heated it melts, ſwells, and blackens. By diſtillation it yields an acid liquor, ſome oil, and a great quantity of gas. There remains charcoal and carbonate of potaſh.

(1376.) The *ſupertartrate of potaſh* contains the tartaric acid in exceſs. It is found encruſted on the bottom and ſides of caſks in which wine had been kept. To ſeparate the impurities, the cruſt is boiled in water, filtered while hot, and the ſolution on cooling depoſits the ſalt in irregular cryſtals. This ſalt, under the name of *cream of tartar*, is often uſed to convey acidity to punch and other liquors. It is alſo uſed as a cooling and aperient medicine. Its ſpecific gravity is 1·953. It is very brittle and eaſily reduced to powder. It diſſolves in 60 parts of cold water, and boiling water takes up $\frac{1}{15}$th of its weight of this ſalt. It is not altered by expoſure to the air; but when a watery ſolution of it is long expoſed, it is gradually decompoſed. A mucous matter is depoſited, and there remains in ſolution carbonate of potaſh, of a brown colour from oil. With heat this ſalt ſwells, blackens, and the acid is entirely decompoſed. By diſtillation it yields the ſame products with the tartrate, and the ſame reſiduum. The acid liquor was long conſidered to be a peculiar acid by the French chemiſts, and was called *pyrotartarous* acid, until Fourcroy and Vauquelin ſhewed it to be acetic acid contaminated with empyreumatic oil. As the carbonate of potaſh, commonly called *ſalt of tartar*, is obtained by burning this ſalt, or rather the cruſt of wine-caſks, it was long a diſpute among chemiſts whether the potaſh previouſly exiſted in the cruſt, or was a product of ignition. The diſpute was at laſt ſettled by Scheele, who firſt pointed out the method of ſeparating the tartaric acid from this ſalt, as ſtated under that article.

(1377.) The conſtituents of ſupertartrate of potaſh, or tartar as it is uſually named, are, according to

	Bergman.	Thenard.
Tartaric acid,	77	57
Potaſh,	23	33
Water,		7
	100	97
Or tartrate of potaſh	56	
Tartaric acid,	44	
	100	

(1378.) Potaſh alſo combines with all the other acids; but as the ſalts it forms have either not been applied to any uſe, or their uſes were pointed out while treating of thoſe acids, it does not ſeem neceſſary to enter farther into theſe combinations.

(1379.) It alſo combines with alcohol as ſtated in the beginning of this ſection, while detailing the methods of obtaining this alkali in a ſtate of purity. By the application of heat, alcohol when combined with potaſh, is partially decompoſed.

(1380.) The combinations of potaſh with oils, or the soaps it forms with them, ſhall be afterwards conſidered.

Sect. III. Soda.

(1381.) Soda, in union with carbonic acid, abounds in various parts of the earth, and particularly in Egypt; and it was known to the ancients under the name of *natron*. It acquired the name of *foſſil*, or *mineral fixed alkali*, becauſe it was ſuppoſed to be peculiar to the mineral kingdom. It is called *barilla*, becauſe the Spaniards give this name to the plant which produces it. In our country it is called *kelp*, becauſe this is the vulgar name of the marine plants from which it is obtained.—In the new nomenclature it obtained the name of *ſoda*, as this is the botanical name of a plant which yields it copiouſly. Sea ſalt is a compound of ſoda and muriatic acid; and the late Mr Samuel Birney eſtabliſhed a manufacture at Leith, one object of which was to abſtract the marine acid from ſalt, and thus to obtain ſoda, by means of litharge or oxide of lead.

(1382.) Soda was long confounded with potaſh, which it reſembles in many particulars. It is of moſt extenſive uſe in manufactures, as it ſerves all the purpoſes of potaſh, and is applied to ſeveral purpoſes which potaſh cannot effect. The ſoda, or barilla of commerce is far from being pure. Beſide carbonic acid, it contains a conſiderable proportion of ſea-ſalt, and of various other ingredients. Our kelp alſo contains much charcoal, which occaſions its dark blue colour. When the marine plants are ſubjected to a higher degree of heat, or rather are more completely oxygenated, this charcoal is converted into alkali, of a white colour, not inferior to Spaniſh barilla. In Spain the plant ſoda is cultivated with a view to obtain this alkali; and what is planted within reach of the ſea-ſpray is ſaid to yield ſoda, while that which grows in inland ſituations is ſaid to yield potaſh, but no ſoda. In France the aſhes of marine plants are commonly called *varec*.

(1383.) Soda is purified by exactly the ſame proceſſes by which potaſh is obtained pure, which were minutely deſcribed when treating of potaſh, and are here referred to.

(1384.) Du Hamel, in 1736, was the firſt perſon who proved that ſoda forms the baſis of ſea-ſalt, and that this alkali differs from potaſh. His concluſions were finally confirmed by Margraaf in 1758. We ſhall ſee that ſoda differs from potaſh in its degree of affinity for certain ſubſtances; in forming ſalts with certain acids which differ in cryſtallization, and other properties, from thoſe formed by potaſh; and in the different ſoaps it forms with oils. Its ſpecific gravity is 1·336. Its colour is greyiſh white; and when expoſed to the air it abſorbs moiſture and carbonic acid; but ſoon becomes dry again, and falls down into powder. It may be obtained in cryſtals by the ſlow evaporation of its watery ſolution.—In all other reſpects it reſembles potaſh ſo entirely that what was ſaid concerning that ſubſtance need not be here repeated. The relative affinities of ſoda are alſo the ſame with thoſe of potaſh, or of vol. alkali.

(1385.) Whether ſoda be a compound? and what are its component ingredients? have been ſubjects of controverſy among chemiſts. Fourcroy ſuppoſed it to conſiſt of magneſia and azote; and Deſormes and Morveau imagined it to conſiſt of magneſia and hydrogen. But Darracq has proved theſe opinions to be untenable. From the experiments detailed in Lord Seaforth's pamphlet, referred to when deſcribing the general characters of the alkalies, it appears that neither ſoda nor potaſh pre-exiſt in marine plants, and that they are products of combuſtion; but how combuſtion effects their formation ſtill remains uncertain. The experiments of Mr Davy, when made known to the public, are likely to throw light upon this ſubject.

(1386.) Soda ſcarcely combines with phoſphorus; but when a ſolution of it is boiled along with phoſphorus, phoſphoreted hydrogen gas is emitted in the ſame way as takes place when potaſh is uſed.

(1387.) Soda acts upon ſulphur exactly in the ſame way as potaſh; and a *hydroſulphuret of ſoda* may be formed by the ſame proceſs as that of potaſh, which it is unneceſſary here to repeat.—We proceed to detail a few of the more uſeful compounds which ſoda forms with acids.

I. Sulphate *of* Soda.

(1388.) This ſalt, compoſed of ſulphuric acid and ſoda, is well known under the name of *Glauber's ſalt*, ſo called from Glauber, a German chemiſt who firſt diſcovered it, in the reſiduum of ſea-ſalt which had been decompoſed by ſulphuric acid. It has alſo obtained the name of *admirable ſalt of Glauber*, *vitriolated mineral alkali*, and *vitriol of ſoda.*

(1389.) This ſalt may be obtained directly, by ſaturating ſoda, or carbonate of ſoda, with ſulphuric acid; but it is moſt commonly procured from the reſiduum of ſea-ſalt, after the muriatic acid is expelled from it, as deſcribed (759) in the manufacture of that acid, or it is prepared from the reſiduum of the manufacture of ſal ammoniac. It exiſts in two ſtates, either of a perfect neutral, or *ſulphate*, or with an exceſs of acid; or *ſuper-ſulphate.*

(1390.) The *ſulphate* by ſlow evaporation forms cryſtals which are ſix-ſided priſms, terminated by dihedral ſummits, and they are tranſparent. According to Wallerius their ſpecific gravity is 2·246. This ſalt is ſoluble in 2·86 times its weight of water at 60°, and in 0·8 of boiling water. By expoſure to the air, it loſes about 56 *per cent* of its weight of water, and falls into powder. By heat it firſt melts in its water of compoſition, and then falls into powder, having loſt about 58 *per cent* of its weight. At a red heat it melts again, and part of the acid is expelled from it. The taſte of this ſalt is cool, bitter, and nauſeous; and it is much uſed as a purgative ſalt.

(1391.) The conſtituents of this ſalt are, according to

	Bergman.	*Kirwan.*
Acid, - - -	27	23·52
Soda, - - -	15	18·48
Water, - - -	58	58·00
	100	100·00

(1392.) The *ſuperſulphate* is formed by diſſolving ſulphate of ſoda in ſulphuric acid. The ſolution depoſits large rhomboidal cryſtals which contain an exceſs of acid. They loſe their exceſs of acid by a moderate heat, and return to the ſtate of ſulphate.

(1393.) The ſulphate is decompoſed by barytes, and partially by potaſh, lime, and ſtrontites. In extracting ſoda from this ſalt, the acid is firſt deſtroyed by being heated in contact with charcoal. The ſulphur is then ſeparated from the ſoda by means of a vegetable acid. Laſtly the vegetable acid is deſtroyed by a red heat, and carbonate of ſoda is obtained, which may be purified by lime.

II. Sulphite *of* Soda,

(1394.) Was firſt deſcribed by Fourcroy and Vauquelin, and is formed by paſſing ſulphurous acid gas through a ſaturated ſolution of carbonate of ſoda. Its cryſtals are four-ſided priſms, two broad, and two narrow; terminated by two-ſided ſummits. Their ſpecific gravity is 2·9566, their taſte cool and ſulphureous; and are ſoluble in four times their weight of cold water, and in leſs than their weight of boiling water. By expoſure to the air, the cryſtals effloreſce, and are gradually converted into ſulphate. Their compoſition is

Sulphurous acid - -	31
Soda - - - - - - -	18
Water - - - - - -	51
	100

III. Nitrate *of* Soda.

(1395.) This ſalt was formerly called *cubic* or *rhomboidal nitre*, and it may be prepared by ſaturating ſoda with nitric acid, or by diſtilling a mixture of common ſalt and nitric acid, or by mixing a nitrate of lime and ſulphate of ſoda, filtering and evaporating the ſolution. It forms tranſparent rhomboidal cryſtals, whoſe ſpecific gravity is 2·0964. Its taſte is cool and ſharp, and ſomewhat more bitter than nitrate of potaſh. It is ſoluble in three parts of water at 60°, and in leſs than its weight of boiling water. It ſlightly attracts moiſture from the air. It does not melt ſo readily in the fire as nitrate of potaſh, though it deflagrates, and exhibits the ſame phenomena. It has never been tried as an ingredient of gunpowder.

(1396.) The conſtituents of this ſalt are, according to

	Bergman.	*Kirwan.* *when dried in a heat of* 400°.
Nitric acid, - - -	43	53·21
Soda, - - - -	32	40·58
Water, - - -	25	6·21
	100	100·00

But after it has been heated to redneſs, its conſtituents are, according to

	Kirwan.	*Richter.*	*Wenzel.*
Acid, -	57·55	62·1	62·5
Soda, -	42·45	37·9	37·5
	100	100	100

IV. MURIATE *of* SODA.

(1397.) This is known under the name of *ſalt*, or of *common ſalt*, and ſometimes of *ſea-ſalt*, becauſe it abounds in the waters of the ocean, and occaſions their peculiar taſte. It alſo occurs in vaſt maſſes in Derbyſhire, and various parts of England; in ſeveral parts of Germany; in Hungary; in Ruſſia and various other parts of the world. In theſe countries it is combined with a red or brown ferruginous clay marl, or ferruginous clay combined with carbonate of lime, and in this ſtate it is known by the name of *rock ſalt*, or *foſſil ſalt*, becauſe it is dug out by mining. Among the rock ſalt there are often irregular maſſes, of various ſize, interſperſed, of a brilliant white colour, which are called *ſal-gem;* becauſe they have the appearance of poliſhed gems to a perſon who views them in the mine. It is thought the waters of the ocean derived their ſalt from vaſt rocks of mineral ſalt interſperſed through them.

(1398.) This ſeems to be the firſt ſalt with which mankind became acquainted, and it is hence ſtill diſtinguiſhed by the name of ſalt. All other ſalts derived their generic name from ſome analogical reſemblance to this. Its univerſal uſe as a ſeaſoner for food, and for preſerving animal ſubſtances, ſhews that the animal frame ſtands in need of its action; and the immenſe quantities of this ſubſtance diſperſed in mineral ſtrata even in the center of extenſive continents, or diſſolved in the waters of the ocean, ſhew the bounty of providence in providing ſo abundantly for the wants of the human race.

(1399.) Salt is extracted from rock-ſalt, by diſſolving it in water, filtering the ſolution, and evaporating. From ſea water it is extracted by ſpontaneous or artificial evaporation. In France, Spain, Portugal, and the ſhores of the Mediterranean, ſea water is let into ponds during the flow of the tide, where it is ſhut up by ſluices, and evaporated by the heat of the ſun. It thus depoſits large cubical cryſtals which are called *large grained* or *bay ſalt*. On the ſhores of the Baltic and other northern regions, they concentrate the ſea water by expoſing it to froſt during winter in ponds. The ice is removed as it forms, and the remaining liquid is boiled into ſalt.

(1400.) But the ſalt obtained in this manner is not pure. It contains various proportions of other ſalts, the principal, and moſt pernicious of which is muriate of magneſia, commonly called *bitters*, from its diſagreeably bitter taſte, and muriate of lime.—It is hence of the greateſt importance for economical purpoſes, eſpecially for the curing of fiſh and animal ſubſtances, to find an eaſy and ſimple proceſs for purifying common ſalt.

(1401.) For chemical purpoſes it may be purified by repeated ſolutions and cryſtallizations. As it diſſolves nearly in equal quantity in cold as in hot water, it can only be cryſtallized by ſlow evaporation. When the evaporation is ſomewhat rapid, its cryſtals are ſquares ſurmounted by pavilion roofs: when it is very ſlow, they are perfect cubes. The late Dr Irvine of Glaſgow, having filtered a ſaturated ſolution of ſalt, locked it in a deſk, and allowed it to remain a very long time without diſturbance. It formed beautiful cubes of the ſize of dice. In our climate ſalt cannot be cryſtallized by evaporation in the air. But what is called *Sundays ſalt*, or what is allowed to cryſtallize in the pans between Saturday night and Monday morning, as it is not agitated by boiling, is much better ſalt than what is formed while the pan is at the boiling temperature. It was hence propoſed to the Highland Society at their firſt commencement, to produce all the ſlow evaporation of the warm climates, by having a pan, charged with ſaturated ſolution, placed above the pan uſually employed in boiling ſalt, to be heated by the ſteam ejected from the lower pan.†

(1402.) This ſalt may alſo be purified by decompoſing the earthy ſalts with which it is contaminated. For this purpoſe volatile alkali, or carbonate of ſoda may be dropped into a filtered ſolution, as long as any precipitate falls. Or the ſalt being diſſolved in four times its weight of pure water, and filtered, drop in firſt muriate of of barytes, then carbonate of ſoda, in ſolution, as long as any precipitate continues to fall. Having ſeparated the precipitates by filtration, evaporate ſlowly until the ſalt cryſtallizes.—It is by the firſt or ſecond of theſe methods that the ſmall grained baſket ſalt is formed, commonly uſed for the table. But as it is difficult to hit the proportion of alkali that ſhould be added, this ſalt has not the agreeable ſharp taſte of that which is formed by cryſtallization.

(1403.) Lord Dundonald having obſerved that the muriates of magneſia and lime, which chiefly contaminate common ſalt, are much more ſoluble in water than this ſalt, and that the former are much more ſoluble in hot than in cold water, while heat or cold does not much affect the ſolubility of common ſalt, propoſed to get rid of theſe contaminating ſalts by waſhing them off. For this purpoſe the common ſalt being raked from the pan, and thrown into an inverted conical veſſel, with a ſmall aperture at its apex, a ſaturated ſolution of pure ſalt is poured, while boiling hot, upon the ſalt to be purified. This ſolution cannot

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† See *Headrick's View, &c, &c. of the Iſland of Arran.*

diſſolve any of the ſalt in the conical veſſel, becauſe it is already ſaturated; but in its deſcent downwards it diſſolves and carries along with it the muriates of magneſia and of lime, with which it comes in contact, and oozes with them through the aperture below. It was found that a ſaturated ſolution of 1 lb. of pure ſalt, poured upon 10 pounds of impure ſalt, carried down about $\frac{4}{5}$ths of the contaminating ſalts.

(1404.) But the ingenious Dr Coventry, Profeſſor of Agriculture at Edinburgh, obſerved that a conſiderable proportion of pure ſalt was ſacrificed at each operation, and that the effect was only to waſh off a portion of the contaminating ſalts which adhered to the ſurfaces of the particles of the muriate of ſoda. He therefore adopted a method, founded on the ſame principles with that of Lord Dundonald, which being verified by practice, was found to be incomparably more effectual. This method is remarkable for its ſimplicity, and the eaſe with which it can be practiſed on any ſcale. We do not feel ourſelves at liberty to explain its nature; but public bodies are called upon to bring it into uſe for the improvement of our domeſtic economy, and the ſucceſs of our fiſheries.

(1405.) The ſpecific gravity of this ſalt is 2·125. Bergman aſcertained that it is ſoluble in 2·82 times its weight of cold water, and in 2·76 times its weight of boiling water. After boiling ſome time it diſſolves in 2·59 times its weight of that liquid. The ſpecific gravity of a ſaturated ſolution, at the temperature of 42°, is 1·198. It is not altered by expoſure to the air; though when contaminated by the muriates of magneſia and of lime, it deliqueſces, and often becomes liquid, unleſs it be kept near a fire.

(1406.) When heated it crackles; and in a red heat it melts, and ſublimes in white ſmoke. From this property it is employed as a flux to glaze the coarſer ſpecies of earthen ware. In a red heat it loſes 2 *per cent* of its weight, partly owing to the expulſion of its water, partly to that of muriatic acid.

(1407.) The reſiduum, or refuſe, left in the manufacture of ſal ammoniac, and other chemical proceſſes where the ſulphuric acid is employed to decompoſe muriate of ſoda, and which conſiſts chiefly of ſulphate of ſoda, has often been employed for extracting ſoda ſeparated from the ſulphuric acid. For this purpoſe the ſulphate of ſoda is mixed with charcoal, and with carbonate of lime, in fine powder; and is expoſed to a ſtrong heat in a reverberatory furnace, and frequently ſtirred. The charcoal decompoſes the ſulphuric acid by abſorbing its oxygen, while the ſulphur is ſublimed, or combines with the lime. A black maſs is left, which being digeſted in water, and filtered, yields about 58 *per cent.* of carbonate of ſoda. Sometimes the ſulphate of ſoda is decompoſed by charcoal, and then the ſulphur is ſeparated from the ſoda by means of acetic acid, or any other vegetable acid, which being deſtroyed by a red heat, carbonate of ſoda, or its ſub-carbonate is obtained.

(1408.) The muriatic acid may alſo be partially ſeparated from ſoda by means of lime, or its carbonate, and Guyton eſtabliſhed a manufactory in France for procuring ſoda in this manner. For this purpoſe the muriate of ſoda, and lime, or powdered chalk, are made into a paſte with water. The lime abſorbs the muriatic acid from the ſoda in contact with it, and carbonate of ſoda forms an efflореſcence on the ſurface of the maſs. The decompoſition advances until it is impeded by the quantity of muriate of lime formed. In this way Scheele, who firſt obſerved this fact, accounts for the quantities of ſoda which are found in ſome parts of Egypt.

(1409.) But theſe proceſſes have not been found to be economical; and the late Mr Samuel Birnie conſtructed a manufactory at Leith for decompoſing common ſalt, and obtaining ſoda, by means of litharge. Lead being converted into litharge, he obtained the ſilver from it; and the litharge being reduced to fine powder, was ſtirred and agitated in ſolutions of ſea-ſalt. The litharge, combining with the muriatic acid, formed an inſoluble compound, while pure ſoda remained diſſolved in the liquid and was waſhed off. The muriate of lead, thus formed, was partly converted into a beautiful yellow pigment, or into paints of various colours; and what could not be conſumed in this way was converted into pure or refined lead. Scheele obſerved that common ſalt may be decompoſed by other metals, ſuch as iron, copper, zinc, &c. as well as lead. If plates of theſe metals be dipped in a ſolution of ſea-ſalt, and afterwards be expoſed to the air, they are ſoon encruſted over with ſoda.

(1410.) Thoſe who have analyſed the muriate of ſoda, have preſented various reſults of its conſtituent parts.—The principal of theſe follow.

	Bucholz.	*Kirwan.*	*Weigleb.*	*Wenzel.*	*Bergman.*	*Dr Thomſon.*
Muriatic acid,	28	38·88	40	46	52	44
Soda,	66	53·00	58	54	42	50
Water,	6	8·12	2		6	6
Total,	100	100	100	100	100	100

V. HYPEROXYMURIATE *of* SODA.

(1411.) This ſalt was firſt deſcribed by Mr Chenevix, and it is formed in the ſame way as the hyperoxymuriate of potaſh. It is difficult to obtain it pure, as it is nearly as ſoluble in water as the muriate of potaſh, with which it is combined at its formation. But it may be ſeparated by ſolution in alcohol, and repeated cryſtallization. It cryſtallizes in cubes, or in rhomboids, differing little from cubes. It produces a cold ſenſation in the mouth, and its taſte differs little from that of muriate of ſoda. Whether this ſalt poſſeſſes the bleaching or exploſive properties of hyperoxymuriate of potaſh, has not been aſcertained. It is compoſed of

66·2	hyperoxymuriatic acid,
29·6	ſoda,
4·2	water.
100·0	

VI. FLUATE *of* SODA.

(1412.) This compound of fluoric acid and ſoda, may be formed by ſaturating ſoda with fluoric acid, in the way that fluate of potaſh is formed.

The ſaturated ſolution cryſtallizes on cooling into ſmall cubical cryſtals. Theſe do not deliqueſce in the air, are not very ſoluble in water, and are of a bitter aſtringent taſte. Before the blow-pipe they melt into a tranſparent globule. The concentrated acids diſengage the fluoric acid from this ſalt with efferveſcence.

VII. Borate *of* Soda.

(1413.) This ſalt is formed by ſaturating ſoda with boracic acid. Its ſpecific gravity is 1·351. It is ſoluble in 2·5 of water at 147°. According to Wenzel its conſtituents are

Boracic acid,	100
Soda,	44.

Its properties have not been examined, as it is not found in nature, which is the caſe with

Sub-borate of Soda, or common Borax.

(1414.) This ſalt is ſuppoſed to have been known to the ancients, and to be the *chryſocolla* of Pliny. Geber mentioned it under the name of *borax* in the ninth century; and Geoffroy in 1732, and Baron in 1748, firſt aſcertained its compoſition. Bergman firſt demonſtrated that the ſoda was in exceſs, or that it was a *ſub-borate*.

(1415.) Borax is brought from the Eaſt Indies in an impure ſtate, under the name of *tinkal*. It is purified by the Dutch, but they keep the proceſs a ſecret. When purified it cryſtallizes in hexangular priſms, of which two ſides are much broader than the others, and terminated by triangular pyramids. Its colour is white, and ſpecific gravity 1·740. It has a ſtyptic alkaline taſte, and it converts vegetable blues to green. It is ſoluble in 20 times its weight of water at 60°, and in ſix times its weight of boiling water. It ſlowly and ſlightly effloreſces in the air.

(1416.) When heated it ſwells, loſes about four tenths of its weight, and forms a light, porous, friable maſs, called *calcined borax*. With a ſtronger heat it melts into a tranſparent glaſs, which is ſtill ſoluble in water. When two pieces of it are ſtruck together in the dark, they emit a flaſh of light.

(1417.) This ſalt is much employed as a flux for metals, and in ſoldering the more precious metals. Mineralogiſts employ it as a flux when minerals are ſubjected to the blow-pipe. In medicine it is employed as an abſorbent, after it has been converted into calcined borax.—Its conſtituents are, according to

	Bergman.	*Kirwan.*
Boracic acid,	39	36
Soda,	17	17
Water,	44	47
	100	100

VIII. Phosphate *of* Soda.

(1418.) This compound of phoſphoric acid and ſoda was firſt extracted from human urine by Margraaf. It was alſo obſerved in urine by ſeveral other chemiſts; but as they could not extract phoſphorus from it, they ſuppoſed it to be compounded with a peculiar acid, to which they gave the name of the *perlated acid;* and the ſalt, from its colour, obtained the name of *perlated ſalt*. Dr Pearſon having introduced this ſalt into medicine as a purgative, propoſed the following proceſs for preparing it.—In a long necked matraſs, diſſolve 1400 grains of cryſtallized carbonate of ſoda in 2100 grains of water at 150° of temperature. Add gradually 500 grains of phoſphoric acid of the ſpecific gravity 1·85. Boil the mixture a ſhort time, and filtrate into a ſhallow veſſel while it continues boiling hot. Being ſet in a cool place it yields cryſtals during ſeveral days; and from the above materials he obtained from 1450 to 1550 grains of cryſtals. Apothecaries prepare this ſalt by pouring ſulphuric acid upon burnt bones. The ſuperphoſphate of lime, which is thus ſeparated from the bones, being filtered, is ſuperſaturated with cryſtals of ſoda. The liquid being filtered, is cryſtallized by ſlow evaporation.

(1419.) The cryſtals of this ſalt are rhomboidal priſms, having acute angles of 60°, and obtuſe angles of 120°, terminated by a three-ſided pyramid. Their ſpecific gravity is 1·333; their taſte very ſimilar to that of common ſalt. To obtain perfect cryſtals, the alkali ſhould be ſlightly in exceſs. At 60° it is ſoluble in four parts of water, and in two parts of boiling water. This ſalt acts as a gentle purgative or laxative, without any of the nauſea or ſickneſs produced by ſulphate of ſoda, and other ſalts; and it may be taken in broth in place of common ſalt.

(1420.) Its cryſtals effloreſce in the air, and when heated undergo watery fuſion. At a red heat they melt into a white enamel; and before the blow-pipe they melt into a tranſparent globule, which becomes opaque on cooling, and its ſurface acquires a polyhedral figure. It is much uſed by mineralogiſts in the fuſion of metals and other minerals; and in ſoldering as a ſubſtitute for borax. Though not altered by metals or combuſtibles, it fuſes with metallic oxides into a colourleſs glaſs. It alſo fuſes into glaſs with moſt of the earths.

(1421.) The ſulphuric, nitric, and muriatic acids decompoſe it partially, and convert it into *ſuperphoſphate of ſoda*. In this ſtate it is more ſoluble in water, and by ſlow evaporation is depoſited in thin ſcales, ſimilar to the boracic acid.

IX. Phosphite *of* Soda.

(1422.) This ſalt is formed by ſaturating ſoda with the phoſphorous acid, and by evaporating the ſolution, the ſalt is obtained in cryſtals. Theſe are irregular four-ſided priſms, or elongated rhomboids. Sometimes they are plumoſe, or in the form of ſquare plates. This ſalt is ſoluble in two parts of cold, and nearly in the ſame quantity of boiling water. Its taſte is cooling and agreeable; it effloreſces in the air, and emits a beautiful yellow flame before the blow-pipe, where it melts into a globule, which becomes opaque on cooling. It is compoſed of

phoſphorous acid,	16·3
Soda,	23·7
Water,	60·0
	100·0

X. Carbonate *of* Soda.

(1423.) The nature of this compound was not known until Dr Black aſcertained the cauſe of the difference between what are called the *mild* and the *cauſtic* alkalies. This compound of the carbonic acid and ſoda, in commerce is known by the names of *kelp*, *barilla*, and *ſoda*, and is obtained either from the decompoſition of common ſalt, or from the combuſtion of the marine fuci. In the latter caſes it contains a conſiderable admixture of earthy ſubſtances, of charcoal, and of ſea-ſalt. It may be ſeparated from the former by ſolution in water, and filtration, and from the ſea-ſalt by very ſlow evaporation. The ſea-ſalt forms very ſmall cryſtals upon the ſurface of the liquor, which muſt be occaſionally ſkimmed off. By continuing the evaporation, the ſubcarbonate of ſoda is obtained in cryſtals.

(1424.) This ſalt, like the carbonate of potaſh, exiſts in two ſtates, 1. The *carbonate* properly ſo called, in which the ſoda is fully ſaturated with the carbonic acid. 2. The *ſubcarbonate*, in which the ſoda is in exceſs; and this is the alkali of commerce.

(1425.) We learn from Klaproth that the *carbonate* is the ſpecies which abounds in Africa, where it forms ſtones which are inſoluble in water. It is found in the province of Sukena near Fezzan, and is called *trona* by the natives. The walls of Oaſſr, a ruinous fort, are ſaid to have been built of it. This ſpecies may be formed artificially, by long expoſure of the *ſubcarbonate* of commerce to an atmoſphere of carbonic acid gas. By expoſure to a red heat, it loſes its water of compoſition, and part of its acid, and is converted into a *ſubcarbonate*.—Its conſtituents, according to Klaproth, are

Carbonic acid,	39
Soda,	38
Water,	23
	100

(1426.) The *ſubcarbonate*, or the *barilla* or *ſoda* of commerce, cryſtallizes in decahedrons, compoſed of four-ſided pyramids applied baſe to baſe, and having their apexes truncated. It is alſo obtained in large tranſparent flat rhomboidal priſms. Its ſpecific gravity is 1·3591; and its taſte the ſame with that of carbonate of potaſh. It is ſoluble in two parts of cold, and in rather leſs than its weight of boiling water; and a ſolution in boiling water, cryſtallizes as it cools. It effloreſces, and falls to powder in the air. Expoſed to heat it undergoes watery fuſion; and often contains ſo much water that after being melted it remains permanently liquid. By a long continued heat the water is expelled, and a violent heat alſo drives off part of the carbonic acid, and it melts into a tranſparent liquid. This ſalt is preferred by the manufacturers of glaſs, becauſe it melts more readily than potaſh, and hence brings ſilex more eaſily into fuſion. It changes vegetable blues and purples to a green. Its decompoſitions by other ſubſtances are every way ſimilar to thoſe of potaſh, and need not be here repeated.

(1427.) The conſtituents of this ſalt are, according to

	Bergman.	*Klaproth.*	*Kirwan.*	
			in cryſtals.	*dried.*
Carbonic acid,	16	16	14·42	40·14
Soda,	20	22	21·58	59·86
Water,	64	62	64	
	100	100	100	100

(1428.) Soda alſo forms compounds with all the metallic, vegetable, and animal acids, which were deſcribed when treating of acids; but as the properties of theſe compounds have not been much examined, and none of them have been applied to any uſe, we deem it unneceſſary to enter into a detailed deſcription of them.

(1429.) Soda combines with alcohol, forming a reddiſh coloured acrid ſolution; and when heat is applied to it, the alcohol ſeems to be partially decompoſed.—Its action on ſulphur and phoſphorus is the ſame with that of potaſh.

(1430.) Soda combines with the fixed oils, and eſpecially with the fat oils, forming *ſoap*. But there is this difference between the ſoaps formed by ſoda, and thoſe formed by potaſh, with the ſame oils, that the ſoda ſoaps are hard, but the potaſh ſoaps are ſoft. This is eſteemed one of the diſcriminating characters by which ſoda is diſtinguiſhed from potaſh; as ſhall be more fully illuſtrated when we come to treat of ſoaps.

(1431.) Soda ſerves the ſame purpoſe in bleaching that is obtained by potaſh and ammonia. It combines with the oils, the reſins, and colouring matter of the cloth, forming them into a ſort of ſoap which is ſomewhat ſoluble in water, and hence can be waſhed out. We ſhall ſee that the alkaline earths have a ſtronger affinity for theſe ſubſtances than any of the alkalies, but they cannot be applied in the proceſs of bleaching, becauſe they form compounds with theſe ſubſtances which are inſoluble in water, and hence cannot be waſhed out of the cloth.

(1432.) We cannot quit the ſubject of Alkalies without adverting to the ſituation of our bleachers and ſoap makers, while forcibly excluded from the potaſh of the continent by Bonaparte, and from that of America by the madneſs of that people in embargoing their own trade. Such conduct on their part demands economy in the uſe of theſe articles on ours.

(1433.) It appears to me that this object may be attained by ſome ſuch proceſs as the following.

(1434.) Let all the ſpent alkaline leys be carefully collected, by forcibly wringing the cloth that had been immerſed in them, or paſſing it between wooden rollers. Let theſe leys be put into a tall wooden vat, and have very cauſtic lime ſifted upon their ſurface, in ſmall portions at a time, and in the fineſt powder. The lime will combine with the ingredients which the alkalies had extracted from the cloth, and forming with them an inſoluble compound, will leave the pure alkalies in ſolution in the water. But it is neceſſary that the liquor be violently agitated during the ſeveral additions of lime, becauſe the firſt portions which combine with the matters with which the alkalies are charged, forming clotty precipitates, would encloſe the remainder of the lime, and prevent it from coming into contact with the matter with which it is intended to combine. In large operations the agitation may be produced by machinery. In the ſame manner the ſpent lees of ſoap may be decompoſed, and the alkali obtained in ſolution in the water. When the lime has abſtracted the whole, or greateſt part, of the matters formerly combined with the alkalies, the inſoluble precipitate may be allowed to ſettle to the bottom of the veſſel, and the clear alkaline ſolution may either be ſeparated by filtration, or drawn off by a ſyphon.—In this way, it is preſumed, the greateſt part of the alkali may be recovered, and the ley, thus depurated, may be applied, in place of a new alkaline ley, to act upon other cloth. Or it may be uſed, inſtead of freſh alkali, for boiling into ſoap.

(1435.) Theſe are only offered as ſuggeſtions which ſeem worthy of trial, and the trials ſhould be on a ſmall ſcale at firſt, until the operator become familiarly acquainted with all the circumſtances of the caſe.—Sir John Dalrymple's method of bleaching by ſteam, formerly deſcribed, poſſeſſes this advantage, that volatile alkali may be made to anſwer all the purpoſes of potaſh; and were the urine which is allowed to run to waſte carefully collected, and applied to this purpoſe, it might nearly ſuperſede the uſe of potaſh.

DIVISION VI.

EARTHS.

(1436.) The word Earth is taken in a variety of ſenſes. Sometimes it means the globe we inhabit, and ſometimes the ſoil or mold in which vegetables grow. But chemiſts have diſcovered that this mold, as well as the ſolid rocks of which the greateſt part of our globe conſiſts, are compoſed of a ſmall number of ſubſtances, mixed and combined together in various proportions, and differing from each other in certain properties. To theſe ſubſtances they have aſſigned the name of Earths; and they are nowhere found in a ſeparate or pure ſtate, their ſeparation and purification being entirely the work of art.

(1437.) The general properties of earths are the following:

Firſt. They are inſoluble in water, or nearly ſo; or they become inſoluble when combined with carbonic acid.

Second. They have hardly any taſte or ſmell, at leaſt when combined with carbonic acid.

Third. They are fixed, incombuſtible, and while pure are not altered by fire.

Fourth. Their ſpecific gravity does not exceed 4·9.

Fifth. When pure may be reduced to a white powder.

Sixth. When heated with combuſtibles they undergo no alteration.

(1438.) Theſe bodies are divided into Alkaline Earths, and Earths proper.—The alkaline earths poſſeſs ſome properties in common with the alkalies already deſcribed. When pure they are ſlightly ſoluble in water. Their ſolution gives a green colour to vegetable blues. They are capable of neutralizing acids.—The earths proper are not ſoluble in water. They do not alter vegetable blues. They do not neutralize acids.

(1439.) The alkaline earths yet diſcovered, are

I. Lime,
II. Barytes,
III. Strontites,
IV. Magneſia,

The earths proper are

V. Alumina,
VI. Silica,
VII. Yttria,
VIII. Glucina,
IX. Zirconia.

Sect. I. Lime.

(1440.) When the uſe of lime as a mortar for buildings, was firſt diſcovered, is not known. But it appears certain that this country was inhabited long before this uſe of lime was known to the people. The many vitrified forts and houſes which occur in this country, and eſpecially in the Highlands, where the ſtones have been cemented by means of heat applied to the internal and external ſurfaces of the building, lead back our thoughts to a period when the uſe of lime was unknown. The ſame concluſion reſults from the conical buildings the remains of which are ſtill ſeen in Shetland and Orkney, in the Hebrides, and various parts of the mainland. We infer that had the people who ſelected the ſtones for ſuch buildings with ſo much care, and placed them with ſo much art, been acquainted with the uſe of lime, they would have had recourſe to it as an eaſier method of making their building cohere. The ancient Greeks and Romans were acquainted with the uſe of lime not only in mortar, but as a medicine. Its uſe as a manure is ſaid to have been diſcovered by accident.

(1441.) Lime, or rather *limeſtone*, abounds in all parts of the world, and a great proportion of the ſolid ſtrata of the earth is compoſed of this material. It ſeldom occurs without a mixture of other earths, and it is found pureſt in certain limeſtones, marbles, ſpars, and chalk. Theſe are only carbonates of lime, and they are converted into *pure*, or *quick*-lime, by ſubjecting them to a white heat, which is called *the burning of lime.* When water is added to burnt lime, it ſwells, and falls down into powder, which is called *ſlacking the lime.* Part of the water is conſolidated in the lime, and becomes part of a ſtone; part flies off in conſequence of the red heat which is generated, and carries particles of the lime along with it, to which the ſmell of ſlacking lime is owing. This heat is ſo great that a large heap of ſlacking lime appears luminous in the dark. Hence ſhips loaded with lime have often been ſet on fire; to prevent which thoſe uſed at the Elgin lime-works, on the Frith of Forth, are furniſhed with a double bottom.

(442.) Pure lime is obtained by burning the white tranſparent ſpars of lime; or by burning the Carrara or any other white marble. It may alſo be obtained by diſſolving oyſter ſhells, or limeſtone, in muriatic acid, and filtering the ſolution. If magneſia, or other earth be preſent, add ſolution of ammonia as long as any precipitate falls. Having again filtered, add ſolution of carbonate of ſoda. The powder which now falls is carbonate of lime, which being well waſhed, and violently heated in a platinum crucible, is converted into pure lime.

(1443.) Pure lime is of a white colour, and eaſily reducible to powder. It is of a hot burning taſte, and it corrodes and deſtroys the texture of animal bodies. It firſt renders vegetable blues green, and afterwards converts them to a yellow. It cannot be fuſed by the moſt violent heats we can apply, not even by that of the moſt powerful burning-glaſſes. Its ſpecific gravity is 2·3.

(1444.) It is to Dr Black we are indebted for our knowledge of the difference between limeſtone and cauſtic lime. He obſerved that during the proceſs of burning, a conſiderable loſs of weight was ſuſtained. To aſcertain what this was owing to, he burnt limeſtone in an iron retort, and received the product over mercury. It was found to conſiſt of what he called *fixed air* (carbonic acid gas) and water. The united weight of theſe products was exactly equal to the weight which the lime had loſt; and when they were recombined with the lime, it returned to its mild or ſtony ſtate. Hence he inferred that lime is a ſimple ſubſtance, and that limeſtone is compoſed of lime, carbonic acid, and water.—The theory then generally received to account for the change produced on lime by burning, was that advanced by Stahl, who aſcribed this effect to the fixation of fire in the ſtone during the proceſs. But it was not proved that fire could be thus fixed in bodies, nor did this theory account for the loſs of weight.—We have already ſtated that lime and the other alkaline earths, as well as the alkalies themſelves, have been proved by Mr Davy not to be ſimple but compound ſubſtances.

(1445.) When lime is expoſed to the open air it gradually attracts moiſture, and falls to powder. At the ſame time it reabſorbs carbonic acid, and returns to its ſtony ſtate. Lime is ſoluble in water in the proportion of about one part of lime to about 500 parts of water; or one ounce troy of water diſſolves one grain of lime. This ſolution is called *lime-water*, and it is commonly made by pouring pure water upon lime in a tall glaſs bottle. After the undiſſolved lime has ſubſided to the bottom, the clear liquor is decanted off, and kept in a corked bottle. Lime water has an acrid alkaline taſte, and renders ſyrup of violets green. It is uſed to cure heartburn, and pains of the ſtomach ſuppoſed to ariſe from acidity. When lime-water is expoſed to the air, a cruſt forms upon its ſurface, which is owing to the combination of carbonic acid with the lime, by which it is reſtored to its ſtony or inſoluble ſtate. When this cruſt is broken another ſoon ſucceeds it; and in this way all the lime may ſoon be precipitated from the water by its ſucceſſive combination with carbonic acid.

(1446.) One very important uſe of lime is the formation of mortar, or cement for building. Mortar conſiſts of quicklime and ſand reduced to a paſte with water. When dry it becomes as hard as ſtone, and adhering to the ſtones in contact with it, it forms the whole building into one ſtone. The lime ought to be very pure, though there are ſome ſpecies of limeſtones which contain ſuch a proportion of ſand, that they make excellent cement without any addition of ſand. In practice maſons judge of the purity of lime from the quantity of ſand neceſſary to form it into mortar. The lime ought to be perfectly cauſtic, or free of carbonic acid. Hence the erroneous practice of what is called *ſouring lime*, or laying the mortar up in heaps before it is uſed, ought to be aboliſhed, as it expoſes the lime to re-abſorb carbonic acid from the air. All that is aimed at by this practice may be obtained by paſſing the lime through a wire ſieve.

(1447.) The beſt kind of ſand for mortar, is that which is called waſhed, or river ſand, and is free of any clay or mud. What is got upon the ſea-ſhore ſhould not be uſed unleſs the ſalts be waſhed from it. Dr Higgins recommends three parts of fine, and four parts of coarſer ſand, and one part of quicklime recently ſlacked, and as little water as poſſible.—The water ſhould be pure, and is the better of being previouſly ſaturated with lime.

(1448.) The hardening of mortar is partly owing to the abſorption of carbonic acid, but chiefly to the conſolidation of part of the water by the lime. Hence if a fourth part of the lime be reduced to fine powder without being ſlacked, the mortar acquires more hardneſs than if the whole had been ſlacked. This was firſt obſerved by Loriot; and Morveau laid down the following proportions as anſwering beſt for mortar.

Fine ſand, - - -	0·3
Cement of well backed bricks,	0·3
Slacked lime, - -	0·2
Unſlacked lime in powder,	0·2
	1·0

The ſame advantage may be attained by uſing as little water as poſſible in ſlacking the lime. Dr Higgins found that the addition of a ſmall proportion of burnt bones, improved the tenacity of mortar, and prevented it from cracking while drying. But they ought never to exceed one fourth of the lime employed.

(1449.) A little mangaheſe, mixed with the mortar, conveys to it the important property of hardening under water. For this purpoſe puzzollano, a volcanic production, which is commonly brought from Italy, but which abounds in the Iſland of Skye and other parts of this country is uſually mixed with the mortar. Morveau obſerved that baſaltes, after being heated in a furnace, and thrown red hot into water, and afterwards paſſed through a ſieve to bring it to the proper ſize, anſwers the ſame purpoſe. It ſeems uncertain whether *water mortar* derives its property from iron in a particular ſtate of oxydation, or from manganeſe, or from a mixture of both. But there are beds of limeſtone in the Iſland of Arran, and many other parts of this country, which contain a portion of iron and manganeſe; after burning they are of an ochreous colour, and make *water mortar* without addition of puzzollano. Mr Telford, engineer of the Caledonian canal, is building the locks, quays, &c. with lime found in the Iſland of Liſmore, without any addition of puzzollano. He tried it in building a ſteam engine within tide, and found it became very ſolid. It thus appears that we poſſeſs within ourſelves materials of great importance to a naval power, without depending upon foreigners for the conſtruction of bridges and harbours.—Another preſcription for water mortar is, four parts of blue clay, ſix parts of black oxide of manganeſe, and 90 parts of limeſtone, all in powder. Calcine the mixture to expel the carbonic acid, then mix with it 60 parts of ſand, and add as much water as will form it into a workable paſte.

(1450.) The order of the affinities of lime for acids is the following.

Oxalic acid,
Sulphuric,
Tartaric,
Succinic,
Phoſphoric,
Saclactic,
Nitric,
Muriatic,
Suberic,
Fluoric,
Arſenic,
Lactic,
Citric,
Benzoic,
Sulphurous,
Acetic,
Boracic,
Carbonic,
Pruſſic.

(1451. The combinations of lime with the ſimple combuſtible are only two in number, namely with *ſulphur* and with *phoſphorus*.

I. Sulphuret *of* Lime.

(1452.) This combination is formed by mixing ſulphur and lime together in powder, and heating them in a crucible. They liquefy and form an acrid reddiſh maſs. When this mixture is expoſed to the air, and moiſtened with water, it acquires a greeniſh yellow colour, ſulphureted hydrogen is formed, and it is converted into a hydrogureted ſulphuret which exhales the fetid odour of ſulphureted hydrogen gas. (See 667, &c.)

(1453.) The hydrogureted ſulphuret may alſo be formed by boiling a mixture of ſulphur and lime in about ten times their weight of water; or by ſprinkling new burnt lime with ſulphur, and then moiſtening it. The heat produced by ſlacking the lime effects their combination. When expoſed to the air, the hydrogureted ſulphuret combines with oxygen, which firſt unites with the hydrogen and then with the ſulphur, converting the compound into ſulphate of lime. When it is kept in a cloſe veſſel, the ſulphur gradually precipitates, and hydro-ſulphuret of lime remains in ſolution. The hydrogureted ſulphuret of lime acts very powerfully on metals and metallic oxides, and it diſſolves charcoal when aſſiſted by heat.

II. Phoſphuret *of* Lime.

(1454.) We owe the combination of phoſphorus with lime to Dr Pearſon.—Into a tube of glaſs, cloſed at one end, one part of phoſphorus is put; and the tube being kept horizontal, five parts of lime in ſmall lumps are puſhed forward to within about two inches of the phoſphorus. The part containing the lime is now made red hot upon burning coals. Then the tube being raiſed, and drawn along the coals, the part which contains the phoſphorus is alſo made red hot. The phoſphorus riſes in vapour, and paſſing through the red hot lime, combines with it. The maſs acquires a glowing red heat, and phoſphureted hydrogen gas is emitted, which takes fire when it comes out to the air.

(1455.) This preparation has a deep brown colour, no ſmell, and it falls in pieces in the air. It is not ſoluble in water, but it decompoſes that liquid when thrown into it, and cauſes it to emit phoſphureted hydrogen gas, which takes fire at the ſurface of the water when it comes in contact with the air. (See 650, &c.) Part of this gas combines with the compound, and forms hydrogureted phoſphuret; for if muriatic acid be poured upon phoſphuret of lime, which has been kept ſome time under water, and then taken out and dried, it flames from the rapid expulſion of phoſphureted hydrogen gas.

(1456.) We come now to conſider the combinations of lime with acids.

I. Sulphate *of* Lime.

(1457.) This compound is known by a variety of names, as *ſelenite*, *gypſum*, *plaſter of Paris*, *alabaſter*, *vitriol of lime*. It abounds ſo much in various parts of the world that it is ſeldom formed artificially. Margraaf and Macquer firſt aſcertained it to be compoſed of ſulphuric acid and lime, and Bergman completed the examination of its properties.

(1458.) It is frequently cryſtallized in octahedrons, or in ſix-ſided priſms with four-ſided ſummits, or lenticular. Theſe cryſtals are often very tranſparent. At the ſpout of Balaggan Strathblane, and in the Iſland of Skye, it occurs in thin beds, which are compoſed of tranſverſe fibres, ſimilar in appearance to ſal ammoniac after it is ſublimed.

(1459.) It is ſoluble in 460 parts of water at 60° and in 450 of boiling water. The ſolution has a nauſeous taſte when drunk in ſome quantity. Mr Paul obſerved that when its ſolution was compreſſed with hydrogen gas in a cloſe veſſel, in ſix months the ſulphuric acid was decompoſed, and the compound converted into a ſulphuret. This ſalt is rendered more ſoluble by the addition of ſulphuric acid; and alſo by nitric and muriatic acids. Its ſpecific gravity varies from 2·1679 to 2·3114. At a red heat it loſes its water of cryſtallization, and falls into a white powder. If this powder be mixed with water, it ſoon becomes ſolid, with increaſe of temperature, and a ſlight enlargement of bulk. This is owing to the water entering into compoſition with the ſalt, and producing a new cryſtallization. Hence this ſalt, under the name of *plaſter of Paris*, has been much employed in taking caſts of medals, ſtatues, &c. of which its enlargement of bulk at the inſtant of its conſolidation, fits it for taking very ſharp impreſſions.—At a violent heat it melts, and before the blow-pipe is converted into a white glaſs.

(1460.) The following are the component parts of this ſalt, according to

	Bucholz,	*Bergman,*	*Richter,*	*Chenevix,*	*Klaproth,*	*Kirwan,*	*Wenzel.*
Sulphuric acid,	43	46	55·75	57	57·57	59	59·84
Lime, -	33	32	44·25	43	42·43	41	40·16
Water, -	24	22					
	100	100	100	100	100	100	100

The five laſt analyſes had been performed on ſalt which had its water expelled by heat.

Anhydrous Sulphate of Lime.

(1461.) This variety is ſo called becauſe it does not ſeem to contain any water in its compoſition. It is found in Sweden, Tyrol, Berne, &c. It is uſually cryſtallized in the form of a rectangular priſm, having two of its faces broader than the other two. Its ſpecific gravity is about 2·950. Its hardneſs is equal to that of calcareous ſpar. It phoſphoreſces when heated, is tranſparent, inſoluble in water; and in other reſpects agrees with the common ſulphate.

II. Sulphite *of* Lime.

(1462.) Is formed by directing a ſtream of ſulphurous acid gas through a bottle containing pure water, in which is ſuſpended chalk or any pure carbonate of lime in fine powder. The ſulphurous acid combines with the lime, with effervescence, and firſt forms with it a white inſoluble powder. But if the operation be continued, it begins to diſſolve, and the ſolution forms, on cooling, ſix-ſided priſms, terminated by long ſix-ſided pyramids.

(1463.) This ſalt has a ſlightly ſulphureous taſte, and requires about 800 parts of water to diſſolve it. In the air it effloreſces, and its ſurface is converted into ſulphate of lime. With heat it loſes its water and falls to powder; a violent heat exhales ſome ſulphur from it, and it is changed into ſulphate.—It is compoſed of

48	ſulphurous acid,
47	lime,
5	water.
100	

III. Nitrate *of* Lime.

(1464.) This ſalt abounds in what is called the *mother water of nitre*, or the liquid in which nitrate of potaſh has been cryſtallized. It may be formed by combining nitric acid with carbonate of lime, evaporating to the conſiſtence of ſyrup, when, by ſlow cooling, it depoſits cryſtals, which are ſix-ſided priſms terminated by long pyramids; but more frequently ſlender brilliant needles. Its taſte is hot and bitter; ſpecific gravity 1·6207. It is ſo extremely ſoluble in water that it is very difficult to obtain it in a dry form. It deliqueſces in the air; and this extreme attraction for moiſture occaſions its being often employed to dry the gaſes. After its moiſture has been expelled by a ſtrong heat, it abſorbs the moiſture from a ſtream of gas paſſed through it. Alcohol diſſolves its own weight of this ſalt.

(1465.) It undergoes watery fuſion, and when evaporated to dryneſs, ſhines in the dark. Hence it was called *Baldwin's phoſphorus*, from the perſon who firſt diſcovered this property. When ſtrongly heated it emits nitrous gas, oxygen gas, and azotic gas, and pure lime remains behind. It ſcarcely detonates with combuſtibles, probably owing to the quantity of water it contains.

(1466.) The ingredients of this ſalt are, according to

	Bergman,	*Kirwan,*	*Richter,*	*Wenzel.*
			The ſalt dried by heat	
Nitric acid,	43	57·44	63·9	66·2
Lime,	52	32·60	36·1	33·8
Water,	25	10·56		
	106	100	100	100

(1467.) This ſalt is found in ſea-water, and in many mineral ſprings, particularly at Lymington in Hampſhire. A ſpring ſtrongly impregnated with it, iſſues from a brown calcareous marl rock in the copper mine of Aithrey, north-weſt from Stirling, which alſo contains in ſolution a portion of common ſalt. There are other indications of rock ſalt exiſting in this neighbourhood.—It was formerly called *fixed ammoniac*, and it may be formed by diſſolving carbonate of lime in muriatic acid.

(1468.) Its taſte is very bitter, and ſpecific gravity 1·76. It is a deliqueſcent ſalt, and has ſo ſtrong an attraction for moiſture that it can ſcarcely be cryſtallized unleſs it be firſt evaporated to the proper conſiſtency, and then cooled in a freezing temperature. Its cryſtals are ſix-ſided ſtriated priſms, terminated by very ſharp pyramids. Concentrated alcohol diſſolves more than its weight of this ſalt. During the ſolution ſo much heat is generated that the alcohol boils.

(1469.) It melts in its water of cryſtallization, and a violent heat expels a part of its acid. When this has taken place, it ſhines in the dark, and was hence called the *phoſphorus of Homberg*.

(1470.) The following are the conſtituents of this ſalt according to

	Bergman.	*Kirwan.* *Salt dried with a red heat.*	*Wenzel.* *Do. with greater heat.*
Muriatic acid,	31	42	51
Lime,	44	50	49
Water,	25	8	
	100	100	100

(1471.) This ſalt is chiefly employed in chemical experiments, and in producing artificial cold by mixture with ſnow or ice. For this purpoſe it ſhould be evaporated to the conſiſtence of a pretty thick ſyrup, and well ſtirred as it cools, that it may conſolidate in very ſmall grains. It ſhould then be kept in a bottle with a glaſs ſtopper.

V. Hyper-

V. Hyperoxymuriate *of* Lime.

(1472.) The hyperoxymuriate of lime is formed by pouring a quantity of warm water upon lime in oxymuriatic gas through the mixture, while it is kept warm. By this proceſs, as was ſtated reſpecting potaſh, there is formed a muriate and hyperoxymuriate of lime. The latter is of a pungent ſtyptic taſte, and of a reddiſh colour, and exhales the odour of the oxymuriatic, but not of the hyperoxymuriatic acid. Ammonia added to the ſolution, decompoſes this ſalt, and there remains common muriate of lime.—This, and other circumſtances, have created a doubt whether there be any hyperoxymuriate formed with lime or with any of the alkaline earths. This point requires farther inveſtigation; but according to Mr Chenevix, this ſalt is extremely deliqueſcent, eaſily melts in its water of cryſtallization, and is very ſoluble in alcohol. Its component parts are ſaid to be

Acid, 55·2
Lime, 28·3
Water, 16·5

100·0

VI. Oxymuriate *of* Lime.

(1473.) This compound is formed by conveying the oxymuriatic acid gas through lime in a ſtate of fine dry powder. This important diſcovery we owe chiefly to Mr Tennant of Glaſgow, who being a bleacher by profeſſion, made numerous experiments with a view to aſcertain the beſt mode of applying the oxymuriatic acid in the proceſs of bleaching. We witneſſed his trying all the alkalies and alkaline earths, as vehicles of the oxymuriatic acid in this proceſs. He found barytes to anſwer rather better than any; but the difficulty and expence of its preparation, in a pure ſtate, led him to prefer lime.

(1474.) After the lime is ſaturated with the oxymuriatic acid, it ſtill retains its original form of a white powder, of a hot diſagreeable taſte, and a ſmell ſomewhat reſembling that of ſea-ware. The acid is decompoſed by heat which cauſes it to emit oxygen gas, and the ſalt is converted into a common muriate of lime. The joint action of ſulphuric acid and heat, expels the oxymuriatic acid from its baſis unchanged; and there remains ſulphate of lime.

(1475.) The oxymuriate of lime diſſolves readily in water, and its acid is decompoſed by it. The ſolution continues to emit bubbles of oxygen gas, until it returns to the ſtate of common muriate of lime. Heat accelerates the emiſſion of oxygen gas from the ſolution of this ſalt. Its ſolution even parts with oxygen gas more readily than the liquid oxymuriatic acid itſelf.—There can be no doubt but the powerful operation of oxymuriate of lime in bleaching, is owing to the eaſe with which it parts with its oxygen gas when diſſolved in water, and is thus converted into a common muriate of lime.

On Bleaching *by the* Oxymuriatic acid.

(1476.) We have reſerved a few remarks on this ſubject for this place, when all the ſubſtances uſed in the proceſs have been deſcribed.—After all the matters which can be abſtracted from cloth by means of acids and alkalies, without materially injuring the fabric, have been removed, there ſtill remains a portion of colouring matter which cannot be removed without danger to the cloth. It ſeems that oxygen, when it combines with this colouring matter, deſtroys its colour entirely, or renders it white. In the ordinary proceſs this combination is effected by expoſing the cloth to the joint action of the air and of the ſun's rays, when it is ſpread upon a field. But this proceſs is very ſlow, and frequently the cloth is in danger of rotting before it can be bleached in this manner.

(1477.) But the oxymuriatic acid, or muriatic acid ſurcharged with oxygen (ſee 775, &c.) being eaſily decompoſed, imparts to the cloth in a ſhort time, that oxygen which it only abſorbs from the atmoſphere after long expoſure to its action. It has therefore been generally adopted as a bleaching liquor, eſpecially for cottons, and the finer ſpecies of linens.

(1478.) At firſt it was combined with water, in a large trough, and the cloths dipped and rinſed in it. But as water abſorbs only a ſmall proportion of this gas (786) and perpetually emits its deleterious ſmell, this method was ſoon abandoned.

(1479.) It was next attempted to ſend the fumes of this gas into a large covered vat which contained the cloth, either hung looſe, or immerſed in water. This practice is continued by ſome, and is generally employed in the bleaching of paper while in its maſhed ſtate.—Chaptal, in his Chemiſtry applied to arts and manufactures, deſcribes a large ſtone trough, lined with varniſh, by which oxymuriatic acid may be combined with water, and made to act upon the cloth; without danger to the workmen.

(1480.) The next effort towards improvement was to combine the oxymuriatic acid with potaſh, ſo as to form the hyperoxymuriate of potaſh, (790, &c.) In this way a much greater quantity of the gas was abſorbed, and concentrated within a given bulk. But the acid, in union with potaſh, does not ſo freely part with its oxygen as it does when combined with water only, and hence a very conſiderable proportion of the acid does not act at all as a bleaching liquor, which is the main object intended. In proof of this it may be obſerved that this combination, after it has exerted all its power in bleaching, when reduced to a dry form, is not found to have reverted to the ſtate of a common muriate of potaſh, but ſtill retains a conſiderable proportion of the oxymuriatic acid undecompoſed.

(1481.) The diſcovery of Mr Tennant, in combining the gas directly with dry lime, ſeems to have removed all the difficulties which attended the uſe of the oxymuriatic acid in bleaching. The lime abſorbs a great proportion of the gas, and forms a proper vehicle for its conveyance wherever it is to be uſed. Its ſolubility in water, and giving out its oxygen gas during its ſolution and reverting to the ſtate of common muriate of lime, are the preciſe properties which were wanted in a bleaching ingredient. None of the oxygen of the acid is thus loſt, and it is only neceſſary to take care that it acts upon cloth at the inſtant of its eſcape from the ſalt.

VII. Fluate *of* Lime.

(1482.) This combination of fluoric acid and lime, (ſee 798, &c.) is known under various names, ſuch as *fluor ſpar, cubic ſpar, phoſphoric ſpar, Derbyſhire ſpar*, &c. The latter name is derived from its abundance in Derbyſhire, where this ſpar is faſhioned into various ornamental and uſeful articles, ſuch as cups, ſalters, candleſticks, &c. It is utterly inſoluble in water, and not altered by the air; and may be formed by paſſing a ſtream of fluoric acid through lime-water. The inſtant the combination takes place, the lime drops from ſolution.

(1483.) But there is no occaſion to form this ſalt artificially, as it abounds very much in nature, eſpecially in Derbyſhire, and is the only ſource from which the fluoric acid has yet been extracted. We have ſeen cryſtallized veins of it interſecting blue calcareous ſand-ſtone on the north-eaſt of Caithneſs, and in ſome parts of Nairne and Inverneſs ſhires. Its cryſtals are often of eight ſides, though the ſides are ſeldom regular. But they are more frequently cubes, and ſometimes the angles, and ſometimes the edges of theſe cubes are truncated. Being inſoluble in water it has no taſte; its ſpecific gravity is 3·1[illegible].

(1484.) When heated it crackles, loſes its water of cryſtallization, and afterwards ſhines in the dark, even when put under water, or in the vacuum of an air-pump. This is the reaſon why it obtained the name *phoſphoric ſpar*. The artificial fluate poſſeſſes this property even in a ſuperior degree to the natural; but after it is kept hot for ſome time, it loſes this property entirely. The cauſe of this is not underſtood. No perceptible alteration of its weight is occaſioned by it, and it ſeems to militate againſt the received doctrines concerning light and combuſtion. (410, &c.) When heated to 51° of Wedgewood, it melts into a tranſparent glaſs. The ſulphuric, phoſphoric, and arſenic acids, when aſſiſted by heat, decompoſe this ſalt, and the fluoric acid is expelled in white fumes. The conſtituents of fluate of lime are ſuppoſed to be

Fluoric acid,	16
Lime,	57
Water,	27
	100

VIII. Borate *of* Lime.

(1485.) Is formed by pouring a ſolution of boracic acid into lime-water. The ſalt formed is hardly ſoluble in water. Its other properties are unknown.

IX. Phosphate *of* Lime.

(1486.) This important combination of phoſphoric acid with lime (629, &c.) is abſolutely inſoluble in water, and forms the baſis of which the bones of animals is compoſed. Shell-fiſhes, and all animals which carry their bones on the outſide of their bodies, have for their baſis carbonate of lime. But man and quadrupeds, and all animals whoſe bones are covered with muſcles, or with integuments, have phoſphate of lime as the ſubſtance which conveys to their bones hardneſs and ſtrength. The importance of this ſubſtance in the bones of animals may be eaſily conceived from the want, or deficiency of it, as takes place in carious bones. If the tibial or ulnar bone of a man be immerſed in muriatic acid, until the acid diſſolves and carries off the phoſphite of lime, the bone becomes a ſoft, fibrous, and flexible ſubſtance, on which may be tied a knot as on a rope.

(1487.) The phoſphate of lime may be obtained pure by burning or calcining bones, in a white heat. Reduce them to powder, and waſh repeatedly with water. Then diſſolve the whole in muriatic acid, and precipitate by means of ammonia. The precipitate being well waſhed, and dried, is phoſphate of lime.

(1488.) Prepared in this manner, it is always in the ſtate of a white powder. It alſo exiſts in the mineral kingdom, and frequently in a cryſtallized form, the figures of the cryſtals varying; and when it thus occurs it has acquired the abſurd name of *apatite*.—It ſuſtains a great degree of heat without alteration; but in an exceſſive heat it ſoftens, and is converted into a white enamel, or ſemitranſparent porcelain.

(1489.) It is partially decompoſed by the ſulphuric, nitric, muriatic, fluoric, and ſome of the vegetable acids; which, as Fourcroy and Vauquelin have aſcertained, abſtract 40 *per cent.* of its lime, and convert the remainder into a *ſuperphoſphate of lime*. The phoſphoric acid alſo abſtracts as much lime from combination with theſe mentioned acids, as converts it into a ſuperphoſphate of lime.

(1490.) The phoſphate of lime is the only ſource from which chemiſts obtain the phoſphoric acid, which being decompoſed by ignited charcoal, yields phoſphorus. This ſubſtance, mixed with clay, is alſo employed in making cupels for operating on metals. It is alſo employed in the poliſhing of metals and of precious ſtones; and for removing greaſe from linen, paper and ſilk. It is often adminiſtered internally to correct the ſuppoſed effects of acids in ſoftening the bones.

(1491.) Its conſtituent parts are, according to

	Klaproth,	*Ekeberg*,	*Fourcroy*,	*Richter*.
Phoſphoric acid,	30·5	39	41	45
Lime,	69·5	36	59	55
Water		25		
	100	100	100	100

(1492.) The *ſuperphoſphate of lime*, or lime charged with an exceſs of phoſphoric acid, had long been miſtaken for the phoſphoric acid itſelf, until it was examined by Fourcroy and Vauquelin in 1795. It is always formed when the phoſphate of lime, or earth of bones, is decompoſed by the ſulphuric acid; and it may be formed by diſſolving phoſphate of lime in phoſphoric acid, until the acid ceaſes to take up any more. By filtering and evaporating, the ſalt cryſtallizes in thin plates, reſembling mother of pearl.

(1493.) It is more ſoluble in hot than in cold water, and hence cryſtallizes on cooling. Its taſte ſtrongly acid; and it is ſomewhat deliqueſcent. Heated it melts in its water, afterwards ſwells and dries. A ſtrong heat converts it into a tranſparent glaſs, which remains inſoluble in water, and is not altered by the air. When ignited with charcoal, its exceſs of acid is decompoſed into phoſphorus, and phoſphate of lime remains behind.—From this combination phoſphorus was uſually obtained. But Fourcroy's proceſs (632) in which the ſuperphoſphate of lime is decompoſed by means of acetate of lead, and that again by charcoal, yields a much greater quantity of phoſphorus from the ſame materials.

(1494.) The oxalic acid only decompoſes this combination, by carrying down the lime from its ſolution in an inſoluble ſtate. The alkalies and earths alſo abſorb and combine with its exceſs of acid. According to Fourcroy and Vauquelin, its component ingredients are,

Phoſphoric acid,	54
Lime, -	46
	100

X. PHOSPHITE *of* LIME.

(1495.) This ſalt is formed by ſaturating lime with the phoſphorous acid (835, &c.), and it conſiſts of an inſoluble white powder. But if the acid be added in exceſs it becomes ſoluble, and forms a *ſuperphoſphite*, which, by evaporation, yields priſmatic cryſtals. Heated, it phoſphoreſces, and exhales a little phoſphorus; and in a violent heat it melts into a tranſparent maſs.—Its conſtituents are,

Phoſphorous acid,	34
Lime, - -	51
Water, - -	15
	100

XI. CARBONATE *of* LIME.

(1496.) This ſubſtance, under the various names of *limeſtone*, *marble*, *chalk*, *lime-ſpar*, &c. abounds in every country, and forms a conſiderable proportion of the ſolid ſtrata of the globe. It is often found pure; but it is more frequently mixed with other earths, with iron and other metals, with coal-culm, bitumen, ſulphur, &c. From it lime is obtained by burning for mortar, and manure for lands.

(1497.) It is often found tranſparent and cryſtallized in rhomboidal priſms, with angles of 101½° and 78½°. This is the primitive form of its cryſtals; but no leſs than 42 varieties of them have been diſcovered. In its cryſtallized ſtate it paſſes under the name of *ſpar*, or *lime-ſpar*. It has ſcarcely any taſte, as it is inſoluble in pure water; but water ſaturated with carbonic acid diſſolves $\frac{1}{1500}$ part of it. By expoſure to the air the carbonic acid flies off, and it reverts to its inſoluble ſtate. This is the reaſon why plants, and even large trees, are often converted into carbonate of lime, with their fibres preſerved entire, and why numerous incruſtations and ſtalagmites are often formed on the ſurface, or in the caverns of rocks. Above Hamilton; in the upper part of the pariſh of Carluke; on the moors ſouth from Inverneſs, and in various other places, there are vaſt accumulations of theſe petrifactions and depoſitions, which have been formed by ſprings flowing from limeſtone rocks, which convey carbonate of lime diſſolved in exceſs of carbonic acid. South from Dalry a cavern in a limeſtone rock is formed by ſtalagmites into the appearance of a Gothic building ſupported by pillars; and the Prince's cave in the iſland of Skye has its entrance formed into the appearance of a ramified Gothic window; while numerous ſtalagmites depend from its roof. The ſpecific gravity of carbonate of lime is about 2·7. It is not much altered by expoſure to the air; but when expoſed to heat, it firſt loſes its water; and if the heat be very much increaſed, it loſes its carbonic acid, and is converted into pure lime.—Its component parts are, according to

	Bergman.	*Kirwan.*	*Dr Thomſon.*
Carbonic acid,	34	45	50
Lime, -	55	55	50
Water, - -	11		
	100	100	100

XII. ARSENIATE *of* LIME.

(1498.) Is formed by ſaturating carbonate of lime with arſenic acid. This ſalt is not ſoluble in water unleſs either the acid or the lime be in exceſs.

XIII. TUNGSTATE *of* LIME.

(1499.) Is found native, and cryſtallized, and may be formed by dropping tungſtic acid into lime-water. This ſalt is inſoluble in water.

XIV. MOLYBDATE *of* LIME.

XV. ACETATE *of* LIME.

(1500.) Is formed by ſaturating carbonate of lime with the acetic acid. By evaporating to the proper conſiſtence, it cryſtallizes on cooling. Its cryſtals are ſmall priſms, of a ſhining ſilky luſtre, of a bitter ſour taſte, and which are not changed by expoſure to the air; but they are ſoluble in water. The ſpecific gravity is 1·005. Expoſed to heat, the acid is partly expelled, and partly decompoſed.—We ſhall have occaſion to mention an important uſe to which this ſalt may be applied in calico printing, and in dyeing.—Its component parts, according to Dr Higgins, are

Acetic acid and water,	64·3
Lime, - -	45·7
	100

XVI. OXALATE *of* LIME.

(1501.) Is formed by dropping oxalic acid into any of the acid ſolutions of lime. The oxalate of lime goes to the bottom in the form of a white powder, which is inſoluble in water, and communicates a green colour to ſyrup of violets. It is not rendered ſoluble by exceſs of acid, nor is it decompoſed by any other acid or alkaline ſolutions, unleſs the acid be decompoſed. But the acid is partly expelled, and partly decompoſed by heat. In (992.) it was ſtated that oxalic acid forms a very uſeful chemical teſt to detect the preſence, and to aſcertain the proportions of lime in ſolutions. According to Bergman the oxalate of lime is compoſed of

48	oxalic acid,
46	lime,
6	water.
100	

(1502.) Lime alſo combines, and forms ſalts, with all the other vegetable and animal acids; but as the properties of theſe compounds have not been fully examined, and none of them have been applied to any uſe, we do not think it neceſſary to enter into a detailed deſcription of them.

(1503.) In addition to the inflammable bodies formerly mentioned, lime only combines with the fixed oils, and with a ſmall quantity of the volatile oils forming Soaps which are inſoluble in water, to be afterwards deſcribed.

Sect. II. Barytes.

(1504.) This earth was diſcovered by Scheele in 1774. It is obtained from a heavy mineral, ſometimes of a white, but oftener of a fleſh colour, brittle, and of a foliated texture, which is common in Britain and other countries, and eſpecially in copper mines. From its great weight it had obtained the name of *ſpathum ponderoſum*, or *ponderous ſpar*. Gahn analyſed it in 1775, and Bergman confirmed the experiments of theſe two chemiſts. It was found to be compoſed of ſulphuric acid, and a peculiar earth, to which Bergman gave the name of *terra ponderoſa*, or *ponderous earth*. Morveau called it *barote*, and Kirwan *barytes*, from the Greek word *βαρυς*, *heavy*; which is the name now generally adopted.

(1505.) Various methods have been adopted for obtaining barytes from the ponderous ſpar, or *ſulphate of barytes* as it is now uſually called; the principal of which are the following.—Reduce the mineral into a fine powder, and mix it with the eighth part of its weight of powdered charcoal. Keep the mixture red hot for ſome hours in a crucible, which will decompoſe the ſulphuric acid, and convert it into a ſulphuret. Diſſolve the ſulphuret in water, and pour nitric acid into it until the ſulphur be precipitated. The ſolution which now conſiſts of nitric acid combined with barytes, muſt be filtered and cryſtallized by ſlow evaporation. The cryſtals being put into a crucible, and expoſed to a violent heat, the nitric acid is expelled, and the barytes remains in a ſtate of purity.

(1506.) Dr Hope propoſed another method which was improved by Pelletier.—Decompoſe the ſulphate of barytes, as before, by heating it ſtrongly along with charcoal powder. Add water to the product until all the ſoluble part is waſhed off, and filter the ſolution. Mix it with a ſolution of carbonate of ſoda, and a white powder falls. Waſh this powder, and having made it into balls with charcoal, heat it ſtrongly in a crucible. The balls being then thrown into boiling water, a portion of the barytes diſſolves, and cryſtallizes as the water cools.

(1507.) Barytes by the firſt method is a greyiſh white, porous body, eaſily pulveriſed. Its taſte is more harſh and cauſtic than that of lime, and taken internally, it operates as a moſt violent poiſon. It changes vegetable blues to green; decompoſes animal bodies like the alkalies; according to Fourcroy its ſpecific gravity is 4. Heat makes it harder, and if it contains water, it fuſes and bubbles before the blow-pipe; but when free of water Lavoiſier found it was not altered by the ſtrongeſt heat he could apply.

(1508.) It attracts moiſture from the air, ſwells, evolves heat, and falls into powder, juſt as when water is ſprinkled on quick-lime. After being thus *ſlacked*, the barytes attracts carbonic acid, loſes its acrid properties, and its weight is increaſed 22 *per cent*. Hence it can only be kept pure in cloſe veſſels. When water is ſprinkled on barytes it ſwells and falls like quick-lime, but more rapidly, and with greater heat.

(1509.) Cold water diſſolves 5 *per cent* of its weight of barytes, and the ſolution is known by the name of *barytes water*. It has an acrid taſte, and converts vegetable blues firſt to a green, and then deſtroys them. Expoſed to the air, it combines with carbonic acid, and forms a ſtony cruſt upon the ſurface, ſimilar to lime-water. Boiling water diſſolves more than half its weight of barytes, and as the ſolution cools the barytes is depoſited in the form of cryſtals. Theſe vary according to circumſtances. Sometimes they reſemble a ſtone compoſed of ſmall needles. When moſt regular, they are flat hexagonal priſms, having two broad ſides, with two intervening narrow ones, and terminated at each end by a four-ſided pyramid. Sometimes the cryſtals are attached to each other ſo as to reſemble the leaf of a fern. They are tranſparent and colourleſs, and contain about 53 parts of water, and 47 of barytes. At a boiling heat they undergo *watery fuſion*, and at a ſtronger heat their water is expelled. Being ſouble in their own water of cryſtallization, boiling water diſſolves any quantity of them, and at 60° one part of the cryſtals diſſolves in 17½ parts of water. When expoſed to the air theſe cryſtals abſorb carbonic acid, and fall to powder.

(1510.) Of the ſimple combuſtibles, only phoſphorus and ſulphur are known to combine with barytes. It has been propoſed to decompoſe the ſulphate of ſoda by means of this earth, in order to obtain its alkaline baſis. But the difficulty of obtaining barytes in a ſtate of purity has rendered the operation too expenſive.

I. Phosphuret *of* Barytes.

(1511.) This compound is formed by putting phoſphorus and barytes into a glaſs tube, and heating them in the ſame way as was deſcribed reſpecting phoſphuret of lime. (1454.) The phoſphuret of barytes is of a dark ſhining brown colour, and exhales, when moiſtened, the ſmell of phoſphureted hydrogen gas. When thrown into water, it emits phoſphureted hydrogen gas, which takes fire when it reaches the ſurface; and exhibits all the phenomena of the phoſphuret of lime. It is decompoſed by the action of air and water, and converted into the *phoſphate of barytes*.

II. Sulphuret *of* Barytes.

(1512.) Is formed by the action of ignited charcoal on the ſulphate of barytes, or ponderous ſpar. It may alſo be formed by mixing ſulphur and barytes together, and heating them in a crucible. They melt and combine at a red heat, and when cold, the *ſulphuret of barytes* forms a reddiſh-yellow maſs, without any ſmell. It rapidly decompoſes water when moiſtened or expoſed to the atmoſphere, and is converted into a hydroguretted ſulphuret. When thrown into boiling water, it ſoon diſſolves in the ſulphureted hydrogen which is rapidly formed, and combines with the water. As the ſolution cools, it depoſits brilliant needle-ſhaped cryſtals, or in ſix-ſided priſms, and ſometimes in hexagonal plates. Theſe Berthollet has ſhewn to be compoſed of ſulphureted hydrogen and barytes, to which he has aſſigned the name of *hydroſulphuret of barytes*.

(1513.) Barytes combines with acids, forming compounds which are diſtinguiſhed by the name of *barytic ſalts*. The order of its affinities for the acids, according to Bergman, is the following.

Sulphuric acid,
Oxalic,
Succinic,
Fluoric,
Phoſphoric,
Saclactic,
Nitric,
Muriatic,
Suberic,
Citric,
Tartaric,
Arſenic,
Lactic,
Benzoic,
Acetic,
Boracic,
Sulphurous,
Carbonic,
Pruſſic.

I. Sulphate *of* Barytes.

(1514.) The combination of ſulphuric acid with barytes was deſcribed (1504.), and it has alſo been diſtinguiſhed by the names of *phoſphoric ſpar*, and *Bolognian ſtone*. It is ſeldom formed by art, as it abounds very much in nature, eſpecially in connection with veins of copper. Its cryſtals aſſume a great variety of forms, but they are generally rhomboidal. In the hills above Caſtle Semple in Renfrewſhire, there are large veins of it, which are generally cryſtallized in form of parallel needles, of a ſilvery whiteneſs. We have ſeen a large maſſy tranſparent cryſtal of it, found in the Devil's Arſe in Derbyſhire, where it adhered to limeſtone, in the form of a five-ſided column, terminating in a pentagonal pyramid.

(1515.) This is the heavieſt of all the ſalts, its ſpecific gravity being 4·4. It is inſoluble in water, or at leaſt is only ſoluble in 43,000 times its weight of water. But it is ſoluble in ſulphuric acid when concentrated and boiling. When ſuddenly heated it crackles and falls into powder, owing to its water of compoſition being ſuddenly converted into ſteam. At 35° of Wedgewood it melts. When formed into a thin cake with flour and water, and heated to redneſs, it ſhines afterwards in the dark. This was firſt obſerved by Vincenzo Caſciarolo, a ſhoemaker of Bologna, and hence this ſalt obtained the name of *Bolognian ſtone*. By the heat it ſeems to be partially decompoſed into a ſulphuret, which undergoes the ſlow inflammation after it is removed from the fire.

(1516.) It is of importance to know the proportion of the ingredients in this compound, as by it the proportion of ſulphuric acid in other compounds is aſcertained. Of the following analyſes, that of Bucholz being the medium, ſeems neareſt the truth.

	Chenevix,	*Thenard,*	*Bucholz,*	*Vauquelin,*	*Fourcroy.*
Sulphuric acid,	24	25·18	31	32	34
Barytés,	76	74·82	69	68	66
	100	100	100	100	100

II. Sulphite *of* Barytes.

(1517.) Is formed by paſſing a ſtream of ſulphurous acid gas through water, in which barytes, or the carbonate of barytes, is diſſolved or ſuſpended. This ſalt is inſoluble in water. By long expoſure to the air it is converted into a ſulphate. Its component parts are,

Sulphurous acid,	39
Barytes,	59
Water,	2
	100

III. Nitrate *of* Barytes.

(1518.) Is obtained by ſaturating the natural carbonate of barytes, or by decompoſing the ſulphuret of barytes (1512.) by the nitric acid. By filtering and evaporating the ſolution, the ſalt cryſtallizes into regular octahedrons; ſometimes into the form of ſtars, or of ſmall brilliant plates. Its ſpecific gravity is 29·149. Its taſte is hot, acrid, and auſtere. Is ſoluble in 12 parts of water at 60°, and in about 4 parts of boiling water. When ſtrongly heated the acid is expelled, and the barytes remains pure. It does not detonate ſo violently with combuſtibles as the other nitrates. The only uſe to which this ſalt has been applied is to detect the preſence of ſulphuric acid in the nitric acid. When dropped in, if ſulphuric acid be preſent, it forms ſulphate of barytes, and goes to the bottom. Its conſtituents are, according to

	Kirwan.	*Fourcroy and Vauquelin.*	*Richter.*
Nitric acid,	32	38	39
Barytes,	57	50	61
Water,	11	12	
	100	100	100

IV. Muriate *of* Barytes.

(1519.) This ſalt is formed by ſaturating the carbonate of barytes, or by decompoſing the ſulphuret of barytes (1512.) by means of the muriatic acid. On filtering and evaporating to a pellicle, the ſolution depoſits tabular cryſtals, or having the form of two eight-ſided pyramids applied baſe to baſe. If iron be preſent in the barytes, the ſalt muſt be expoſed to a high heat, which expells the muriatic acid from the iron. Being afterwards diſſolved in water, the oxide of iron drops to the bottom, and the pure ſalt may be again cryſtallized. Its taſte is pungent and diſagreeable; its ſpecific gravity is 2·8527. Expoſed to heat it dries, and falls into powder, and at laſt melts; but it is not decompoſed by any heat that can be applied.

(1520.) This ſalt is ſaid to have been adminiſtered with good ſucceſs in the cure of ſcrophula. But the doſe ſhould not exceed five or ſix drops of the ſaturated ſolution at firſt; as all the ſoluble ſalts of barytes, as well as the earth itſelf, are violent poiſons.—The muriate of barytes is much employed by chemiſts, as a teſt to diſcover the preſence of ſulphuric acid in liquid ſolutions. As barytes takes ſulphuric acid from all its known combinations, and forms with it an inſoluble compound, the muriate of barytes in ſolution, being dropped into any liquid which contains ſulphuric acid, either looſe or combined, the acid unites with the barytes and goes with it to the bottom. The precipitate may be collected, waſhed, dried, and weighed, and from Table (1516.) the amount of ſulphuric acid contained in the liquid may be aſcertained.

(1521.) The conſtituents of this ſalt are, according to

	Kirwan.		*Fourcroy.*
	in cryſtals.	*dried.*	
Muriatic acid,	20	23·8	24
Barytes,	64	76·2	60
Water,	16		16
	100	100	100

V. HYPEROXYMURIATE *of* BARYTES.

(1522.) Mr Chenevix firſt formed this ſalt by paſſing a current of oxymuriatic acid gas through a large quantity of warm water, which held pure barytes in ſolution. Two compounds are formed, the muriate of barytes laſt deſcribed, and the hyperoxymuriate.—He decompoſed the muriate of barytes by boiling with phoſphate of ſilver, which converted it into muriate of ſilver, and phoſphate of barytes, ſalts which are inſoluble; and there remained in ſolution only the hyperoxymuriate of barytes. Four parts of cold water diſſolve one of this ſalt, and warm water a greater quantity. It is decompoſed by all the acids which have a ſtronger affinity for barytes than the hyperoxymuriatic acid, and the decompoſition is accompanied with flaſhes of light.—Its component parts are,

Hyperoxymuriatic acid,	47·0
Barytes,	42·2
Water,	10·8
	100

VI. OXYMURIATE *of* BARYTES.

(1523.) This compound was formed by Mr Tennant of Glaſgow, by conveying a ſtream of the oxymuriatic acid gas, through a veſſel which contained pure barytes in a ſtate of dry powder.—It was formerly mentioned that Mr Tennant found barytes to be among the beſt of all vehicles for conveying the oxymuriatic acid, and imparting its oxygen to cloth in the proceſs of bleaching. But the difficulty and expenſe of procuring barytes in a ſtate of purity induced him to prefer lime.

VII. FLUATE *of* BARYTES.

VIII. BORATE *of* BARYTES.

IX. PHOSPHATE *of* BARYTES.

X. PHOSPHITE *of* BARYTES.

(1524.) We eſteem it unneceſſary to enter into a deſcription of theſe ſalts, as their properties have not been much examined, and they have not been applied to any uſe.

XI. CARBONATE *of* BARYTES.

(1525.) This ſalt is formed by expoſing a ſolution of barytes in water to the air, (1509.) or by paſſing a current of carbonic acid gas through barytes water. It alſo occurs native at Angleſark in Lancaſhire, and a few other places, and having been firſt obſerved by Dr Withering, it is ſometimes called *Witherite.* It has alſo obtained the names of *aerated heavy ſpar*, and of *aerated baroſelenite.* The native carbonate is far from being ſo abundant as the ſulphate of barytes, and both form veins which interſect the other ſtrata. It is found cryſtallized in four different ways, in double ſix-ſided, and double four-ſided pyramids; in ſix-ſided columns terminated by a hexagonal pyramid; and in ſmall thin radiated cryſtals. When native its ſpecific gravity is 4·331; when prepared artificially it is 3·763. It has no taſte, and yet is poiſonous. Cold water diſſolves $\frac{1}{4304}$th part, and boiling water $\frac{1}{2304}$th part of this ſalt. If the water be ſaturated with carbonic acid, it diſſolves $\frac{1}{830}$th part. When expoſed to a violent heat in a black lead crucible, or formed into a paſte with charcoal powder, the carbonic acid is expelled, and the ſalt is decompoſed.

(1526.) The conſtituents of this ſalt are, according to

	Bergman,	*Withering,*	*Pelletier,*	*Kirwan.*
Carbonic acid,	7	20	22	22
Barytes,	65	80	62	78
Water,	28		16	
	100	100	100	100

(1527.) Barytes alſo combines with all the other acids which were deſcribed under the diviſion of ACIDS, but as its other acid compounds have not been much examined, and are applied to no uſe, we forbear entering into a detailed deſcription of them.—We need only mention that with the acetic acid it forms a ſoluble ſalt which may be uſed to detect the preſence of ſulphuric acid in vinegar, if there be any ſuſpicion of adulteration. But the muriate of barytes, deſcribed (1519.) will anſwer the ſame purpoſe.

(1428.) Barytes does not combine with the metals; but it combines with ſome of the metallic oxides, forming compounds which have not been examined. For example: it firſt precipitates the oxides of ſilver and of lead from nitric acid, when dropped in a ſtate of ſolution into ſolutions of theſe ſalts; but if exceſs of barytes be added, the precipitates are again diſſolved.

(1529.) Barytes alſo combines with ſome of the oils, forming SOAPS which are inſoluble in water.

SECT. III. STRONTITES, or STRONTIAN.

(1350.) This earth is ſo called from the lead mine of Strontian, in the diſtrict of Morven, Argyleſhire. A mineral was obſerved in that mine about 1787, which being examined by Dr Crauford in 1790, it excited a ſuſpicion that it contained a peculiar earth. This mineral was more fully examined in 1791 by Dr Hope, who publiſhed the reſult of his experiments upon it in the Edinburgh Tranſactions of 1794, and he aſcertained that it conſiſted of carbonic acid united to a peculiar earth, to which he gave the name of *Strontites*, from the mine in which it was found. About the ſame time this mineral was analyſed by Klaproth, by Kirwan, by Pelletier, Fourcroy and Vauquelin, and the properties of this earth were more fully inveſtigated. Klaproth gave it the name of *Strontian*, which is now generally adopted.

(1531.) Since its firſt diſcovery, ſtrontian has been found to abound in various parts of the world, and it is always found combined with the carbonic acid, or with the ſulphuric acid.

(1532.) To ſeparate the carbonic acid from ſtrontian, the mineral muſt be mixed with charcoal powder, and expoſed to a heat of 140° of Wedgewood. Or the carbonate of ſtrontian may be diſſolved in nitric acid, the ſolution evaporated until it cryſtallizes, and the cryſtals be expoſed to a red heat in a crucible until the acid is expelled.—Strontian is obtained from its ſulphate exactly in the ſame way as barytes is obtained from ſulphate of barytes. See (1505, 1506.)

(1533.) Strontian thus obtained pure is a porous maſs, of a greyiſh white colour. Its taſte is acrid and alkaline; it acts on animal bodies, though not ſo ſtrongly as barytes, nor is it poiſonous. It changes vegetable blues to a green. Its ſpecific gravity is 1·647. It does not melt by heat like barytes; but before the blow-pipe it exhibits a white light ſo brilliant that the eye can ſcarcely behold it.

(1534.) Strontian becomes hot, and falls into powder, like barytes and lime, when water is ſprinkled upon it. But it is not ſo ſoluble in water as barytes. At 60°, 162 parts of water diſſolve one of ſtrontian, and the ſolution, which is tranſparent, is called *ſtrontian water*. Boiling water diſſolves a much larger quantity of ſtrontian, and as the ſolution cools, it depoſits colourleſs tranſparent cryſtals. Theſe are in the form of thin quadrangular plates, or parallelograms, of about $\frac{1}{4}$th of an inch in length. Sometimes they form two facets which meet at an angle like the roof of a houſe. Sometimes their form is cubical. They contain 68 parts of ſtrontian in 100 of water; and are ſoluble in 51·4 parts of water at 60°, and in double their weight of boiling water. The ſpecific gravity of the cryſtals is 1·46. Expoſed to the air, they part with their water, attract carbonic acid, and fall in powder.

(1535.) Of the ſimple combuſtibles, ſtrontian only combines with phoſphorus and ſulphur.

I. Phosphuret *of* Strontian.
II. Sulphuret *of* Strontian.

(1536.) Theſe combinations are formed in the ſame way as thoſe of barytes, and their phenomena are every way ſo ſimilar that it does not ſeem neceſſary to recapitulate them. (1511, 1512.)

(1537.) Strontian is chiefly diſtinguiſhed from barytes and the other earths by the ſalts it forms with acids; a few of which may be conſidered. The order of its affinities for acids follows.

Sulphuric acid,
Phoſphoric,
Oxalic,
Tartaric,
Fluoric,
Nitric,
Muriatic,
Succinic,
Acetic,
Arſenic,
Boracic,
Carbonic.

I. Sulphate *of* Strontian.

(1538.) This ſalt may be formed by dropping ſulphuric acid into ſtrontian water, when it goes down in the form of white powder. But it occurs native, in great abundance, in various parts of the world, uſually cryſtallized in rhomboidal priſms. It is only ſoluble in 3840 parts of boiling water. It diſſolves readily in hot ſulphuric acid, a ſpecies of ſuperſulphate, which is precipitated by the addition of water.

(1539.) The ſulphate of ſtrontian, according to Vauquelin, is compoſed of 46 ſulphuric acid,
54 ſtrontian.
———
100

According to Klaproth and others, it contains
42 acid,
58 ſtrontian.
———
100

II. Nitrate *of* Strontian.

(1540.) This ſalt may be formed by diſſolving carbonate of ſtrontian in nitric acid; or by decompoſing the ſulphuret of ſtrontian, formed as directed reſpecting the ſulphuret of barytes (1512.) by the addition of nitric acid. After filtering, the ſolution ſhould be evaporated to dryneſs, rediſſolved in water, and cryſtallized by very ſlow evaporation.

(1541.) Its cryſtals are regular octahedrons; its taſte acrid and cooling; its ſpecific gravity 3·006. Boiling water diſſolves nearly double its weight of this ſalt, and water at 60° nearly its own weight. In moiſt air it deliqueſces; but in a dry air it effloreſces and falls into powder. Heated in a crucible, it firſt decrepitates, and afterwards melts. In a red heat it boils, and parts with its acid. If a combuſtible body be thrown into it while red hot, it deflagrates with a very vivid red flame. If a cryſtal of this ſalt be put into the wick of a candle, the flame aſſumes a very beautiful purple colour.—This is one of the diſcriminating characters of ſtrontian from other earths, that the earth itſelf, or its ſalts, convey a very vivid red or purple colour to flame in which they are immerſed. By decompoſing the nitrate of ſtrontian by means of heat, or of deflagration, the earth is obtained in the higheſt ſtate of purity.

(1542.) The ingredients of this ſalt are, according to

	Kirwan,	*Vauquelin,*	*Richter.*
Nitric acid,	31·07	48·4	51·4
Strontian,	36·21	47·6	48·6
Water,	32·72	4	
	100	100	100

III. Muriate *of* Strontian.

(1543.) This ſalt may be formed by ſaturating carbonate of ſtrontian with muriatic acid; or by decompoſing the ſulphuret of ſtrontian by the ſame acid. The ſolution being filtered, and evaporated to the proper conſiſtence, depoſits cryſtals in the ſhape of long, ſlender, hexagonal priſms. Its ſpecific gravity is 1·4402; its taſte ſharp and penetrating. Two parts of water at 60° diſſolve three of the cryſtals; and boiling water any quantity of them. This ſalt is alſo ſoluble in alcohol in the proportions of one in 24 parts of alcohol at 60°, and of one in 19 parts of boiling alcohol. When alcohol holding this ſalt in ſolution is ſet on fire, it exhibits a moſt beautiful purple flame. In a very moiſt air this ſalt deliqueſces; but in dry air remains unchanged. It is thought that an exceſs of acid renders it more cryſtallizable. Its conſtituents are, according to

	Kirwan.	*Vauquelin.*	*Hope.*
Muriatic acid,	18	23·6	31
Strontian,	40	36·4	69
Water;	42	40	
	100	100	100

IV. Hyperoxymuriate *of* Strontian.

(1544.) Was prepared by Mr Chenevix by the proceſs deſcribed (1522). It cryſtallizes in needles, and imparts the ſenſation of cold when taken into the mouth. Its conſtituents are

46 acid,
26 ſtrontian,
28 water.

100

V. Oxymuriate *of* Strontian.

(1545.) Was prepared in the dry way by Mr Tennant of Glaſgow; and ſtrontian was found to anſwer very well as a vehicle for the oxymuriatic acid uſed in bleaching. But its uſe was abandoned for the reaſons already aſſigned.

VI. Carbonate *of* Strontian.

(1546.) Was deſcribed (1531) as occurring native. It is found at Strontian, and at Leadhills in Scotland. Dr Crauford firſt ſhewed that it differed from carbonate of barytes, and its nature was more fully illuſtrated by Dr Hope and others. It uſually occurs in ſtriated ſemitranſparent maſſes, which have a greeniſh tinge.

(1547.) It may be formed artificially, by conveying a ſtream of carbonic acid gas through ſtrontian water; or by precipitating any ſoluble ſalt of ſtrontian by means of an alkaline carbonate.—This ſalt has no taſte, and it is only ſoluble in 1536 parts of boiling water. Its ſpecific gravity is about 3·66. When ſtrongly heated, eſpecially if made into a paſte with charcoal powder, it loſes a portion of its acid. It emits red ſparks when thrown in powder on burning coals. When heated to 226° of Wedgewood, Sauſſure obſerved that it melted into a tranſparent glaſs. Its component parts are, according to

	Hope,	*Pelletier,*	*Klaproth.*
Carbonic acid,	30·2	30	30·0
Strontian,	61·2	62	69·5
Water,	8·6	8	0·5
	100	100	100

(1548.) Strontian alſo enters into combination with all the other acids; but as the ſalts it forms with them have not been particularly examined, and are not applied to any uſe, we eſteem it unneceſſary to enter into a minute deſcription of them.

Sect. IV. Magnesia.

(1549.) This ſubſtance was firſt expoſed to ſale by a canon at Rome, about the beginning of the 18th century, and was long extolled as a cure for all diſeaſes. Its form was a white powder, to which he gave the name of *magneſia alba*. In 1707 Valentini obtained it by calcining the liquid which remains after the cryſtallization of nitre; and Slevogt found it might be precipitated by potaſh from this liquid, which is commonly called the *mother ley of nitre*. It was long confounded with lime, until Dr Black made his celebrated experiments in 1755, by which he aſcertained it to be a peculiar earth. His diſcoveries were more fully illuſtrated and confirmed by Margraaf, Bergman, and Butini of Geneva.

(1550.) Although magneſia is very generally mixed with other earths, and eſpecially with thoſe that are formed from the combuſtion or diſſolution of animals and vegetables; or abounds in union with acids, it is nowhere preſented by nature in a pure ſtate. To obtain it pure, the *ſulphate of magneſia*, a ſalt compoſed of ſulphuric acid and magneſia, and alſo called *Epſom ſalt*, becauſe it is extracted from ſprings at that place, muſt be diſſolved in water, and have half the weight of the Epſom ſalt of potaſh added in ſolution. The potaſh combines with the ſulphuric acid, and the magneſia goes to the bottom in the form of a fine white powder. This powder being well waſhed and dried, is magneſia.

(1551.) The magneſia manufacturers in the neighbourhood of Edinburgh commonly precipitate this ſubſtance from *bittern*, or the muriate of magneſia which remains diſſolved in the brine after the ſea-ſalt has granulated. They uſe for this purpoſe volatile alkali, which they extract from from raſpings of horns, of bones, or from urine. Theſe are put into a ſtrong ſtill with a portion of quicklime to abſorb the carbonic acid, and the volatile alkali in its gaſeous ſtate is blown through the brine which is contained in a ſeparate veſſel. The alkali thus combines with the muriatic acid, while the magneſia, formerly in union, is thrown down in the ſtate of a fine white powder. The advantage of this proceſs is, that there is a quantity of ſal ammoniac formed, equal to the amount of the muriate of magneſia deſtroyed. The magneſia being removed and well waſhed, the liquor is boiled to dryneſs, and the ſal ammoniac is purified by ſublimation; as directed when treating

ing of that ſalt.—Or the ſal ammoniac may be again decompoſed by lime, and its volatile alkali may be again thrown in, and made to precipitate the magneſia from a freſh quantity of brine.

(1552.) Magneſia thus obtained pure, is a very ſoft white powder, with hardly any taſte, and no ſmell. It changes delicate vegetable blues to green. Its ſpecific gravity is about 2·3. It does not melt in the moſt violent heat that can be applied; but if if it had been made into a paſte with water, it ſomewhat ſhrinks in its dimenſions. After being heated, it becomes luminous in the dark when rubbed upon a hot iron plate.

(1553.) It is almoſt inſoluble in water, as it requires, according to Kirwan, about 7900 times its weight of water at 60° to diſſolve it. But it conſolidates water, like lime, in the proportion of 18 parts to 100. When combined with carbonic acid, for which it has a ſtrong attraction, it is capable of abſorbing and retaining $1\frac{1}{3}$ times its weight of water. When expoſed to the air this water evaporates, though more ſlowly than from lime. It attracts water, and carbonic acid gas from the air, but much more ſlowly than lime.

(1554.) Magneſia is much uſed in medicine, as a gentle laxative, and for correcting the acidity of the ſtomach. It does not combine with alkalies, nor with metallic oxides; but when mixed in certain proportions with other earths, and heated, it forms a glaſs, or enamel. It alſo enters into triple compounds with ammonia.

(1555.) This earth enters into union with all the acids, forming compounds which are diſtinguiſhed by the name of *magneſian ſalts*. The order of its affinities for acids, according to Bergman, is the following.

Oxalic acid,
Phoſphoric,
Sulphuric,
Fluoric,
Arſenic,
Saclactic,
Succinic,
Nitric,
Muriatic,
Tartaric,
Citric,
Lactic,
Benzoic,
Acetic,
Boracic,
Sulphurous,
Carbonic,
Pruſſic.

(1556.) This differs from the other alkaline earths, in not forming any combination with phoſphorus. The only ſimple combuſtible with which it is known to unite, is ſulphur, forming

SULPHURET *of* MAGNESIA.

(1557.) This may be formed by mixing two parts of magneſia, and one of ſulphur, and expoſing them to a gentle heat in a crucible. They combine and form a yellow powder, which emits a ſmall portion of ſulphureted hydrogen gas when thrown into water. A greater heat evaporates the ſulphur, and the magneſia remains pure.

(1558.) We proceed to conſider the ſalts formed by this earth with acids, and ſhall obſerve the rule we have hitherto kept in view, of deſcribing only thoſe which may ſeem to be of importance.

I. SULPHATE *of* MAGNESIA.

(1559.) This compound of ſulphuric acid and magneſia is held in ſolution in the ſprings at Epſom in England, and was extracted from them, by evaporation, more than a century ago. It was hence called *Epſom ſalt*; and *ſal catharticus amarus*, or bitter purging ſalt, on account of its taſte, and the uſe to which it was applied. In Italy it is extracted from beds of ſchiſtus, which contain magneſia combined with ſulphur. The mineral being burnt or roaſted, the ſulphur is converted into ſulphuric acid, which combining with the magneſia, converts it into ſulphate of magneſia. By ſolution in water, and adding a little lime to precipitate any metallic ſalts that may be preſent, the ſulphate of magneſia is obtained pure by repeated cryſtallizations.

(1560.) We have found this ſalt, often in conſiderable quantity, in the aſhes of certain peats, and in the aſhes of coals, eſpecially thoſe of a white colour. Many of the dark coloured ſtrata commonly called *blaes*, or *bituminated ſchiſtus*, which accompany coal, abound with this ſalt, and it may be ſeen forming a white efloreſcence, like hoar froſt, on the face of theſe ſtrata where they are expoſed to the air. This is particularly the caſe at Nethan foot, in the pariſh of Leſmahago, Lanarkſhire. We preſented ſpecimens of this ſalt, and of magneſia precipitated from it, obtained from beds of ſchiſtus at this place, to the late Dr Black; and that illuſtrious chemiſt declared his opinion that ſulphate of magneſia might be profitably extracted from theſe beds of ſchiſtus in the Italian method.

(1561.) A portion of the ſulphate of magneſia alſo exiſts in ſea-water, and makes part of the *bittern brine* from which our manufacturers precipitate magneſia, as deſcribed (1551).

(1562.) When the ſolutions of this ſalt are evaporated to a pellicle, it cryſtallizes by ſlow cooling. Its cryſtals are ſmall ſhining quadrangular priſms, of equal planes, ſurmounted by quadrangular pyramids, or by dihedral ſummits. The cryſtals are doubly refrangent. Its taſte is very bitter, and ſpecific gravity 1·66. It is ſoluble in its own weight of water at 60°, and in leſs than two-thirds of its weight of boiling water. The bulk of the water is increaſed $\frac{4}{10}$ths by adding the ſalt. It effloreſces in the air, and falls to powder. Heated it melts in its water, and afterwards dries, but is not decompoſed by heat. Before the blowpipe it melts with difficulty into an opaque glaſs. —It is employed in medicine as a purgative, and from it the earth of magneſia is uſually extracted by precipitation.

(1563.) The following are the conſtituents of this ſalt, according to

	Kirwan,	*Wenzel,*	*Monjou,*	*Bergman.*
Sulphuric acid,	29·35	30·64	32	33
Magneſia,	17·00	16·86	19	19
Water,	53·65	52·50	49	48
	100	100	100	100

II. Sul-

II. Sulphate *of* Magnesia-and-Ammonia.

(1564.) This triple compound of ſulphuric acid, magneſia, and ammonia, may be formed by mixing ſaturated ſolutions of ſulphate of magneſia and of ammonia. Cryſtals are immediately depoſited, which conſiſt of the two ſalts combined together. Or it may be formed by the partial decompoſition of ſulphate of magneſia by means of ammonia. This ſalt is leſs ſoluble in water than either of its ingredients. Its cryſtals are octahedrons; its ſpecific gravity 1·696; its taſte acrid and bitter. According to Fourcroy it is compoſed of

68 ſulphate of magneſia,
32 ſulphate of ammonia,

100

III. Sulphite *of* Magnesia.

(1565.) Is formed by paſſing ſulphurous acid gas through two parts of water, which has one of carbonate of magneſia ſuſpended in it. The ſalt at firſt goes down in powder; but after it acquires exceſs of acid, it diſſolves. It effloreſces in the air, and is ſlowly converted into ſulphite of magneſia. Its component parts are,

Sulphurous acid,	39
Magneſia,	16
Water,	45
	100

(1566.) A ſulphite of magneſia and ammonia, or a triple compound of ſulphurous acid, magneſia, and ammonia, may alſo be formed as in the laſt example.

IV. Nitrate *of* Magnesia.

(1567.) This ſalt was formerly called *nitre with baſe of magneſia*, and *magneſian ſaltpetre*. A portion of it exiſts in the mother water of nitre, and it was probably the firſt ſource from which magneſia was obtained. It may be formed by ſaturating magneſia with nitric acid, evaporating to a proper conſiſtency, when the ſalt cryſtallizes by ſlow cooling. Its cryſtals are rhomboidal priſms, or ſmall needles attached to each other. Its taſte is diſagreeably bitter; its ſpecific gravity 1·736.

(1568.) It is ſoluble in little more than its weight of water at 60°, and is ſtill more ſoluble in boiling water. It is partially ſoluble in alcohol. It deliqueſces in the air. When heated melts in its water, then dries, and in a ſtrong heat it gives out oxygen gas, then nitrous gas, and laſtly nitrous acid; and the pure earth remains behind. It ſcarcely explodes with combuſtibles. Its conſtituents are, according to

	Bergman,	*Kirwan,*	*Richter,*	*Wenzel.*
Nitric acid,	43	46	69·6	72
Magneſia,	27	22	30·4	28
Water,	30	32		
	100	100	100	100

(1569.) A *nitrate of magneſia-and-ammonia*, or a triple compound conſiſting of nitric acid, magneſia, and ammonia, may alſo be formed in the ſame way that was deſcribed (1564) reſpecting the ſulphate.—This ſalt is decompoſed by heat, and burns ſpontaneouſly when ſet on fire.

V. Muriate *of* Magnesia.

(1570.) This ſalt forms about 27 *per cent.* of the ſaline matters which are diſſolved in ſea-water. It is alſo found, in various proportion, in all beds of rock-ſalt. It is diſſolved in ſeveral mineral ſprings, particularly in that at Lymington in Hampſhire. This is the bittern of the ſalt manufacturers, and it is the moſt pernicious ſalt with which common ſalt is contaminated. In (1551) we ſtated that it is uſed for precipitating magneſia by the manufacturers of this country.

(1571.) As this ſalt abounds in nature, it is ſeldom formed artificially. But it may be formed by ſaturating carbonate of magneſia with muriatic acid, and evaporating to a proper conſiſtency. Its attraction for moiſture is ſo great, that it cannot be cryſtallized, unleſs it be concentrated by a ſtrong heat, and then ſuddenly cooled by plunging the veſſel into ſnow, or into a freezing mixture. It then ſhoots into ſmall needles. Its ſpecific gravity is 1·601. Its taſte is diſagreeably bitter, hot, and pungent. It diſſolves in rather more than half its weight of water. It deliqueſces by expoſure to the air, and attracts 66 parts in 100 of its weight of water. This deliqueſcence is the reaſon why common ſalt contaminated with it, melts when expoſed to the air; for pure common ſalt is not altered by the air. A ſaturated ſolution of it ſoon forms a jelly. In a very ſtrong heat the acid is expelled from the magneſian baſe. The following is the proportion of the conſtituents of this ſalt, according to

	Bergman,	*Kirwan,*	*Wenzel.*
Muriatic acid,	34	34·59	57
Magneſia,	41	31·07	43
Water,	25	34·34	
	106	100	100

VI. Muriate *of* Magnesia-and-Ammonia.

(1572.) This triple compound of muriatic acid, magneſia, and ammonia, is formed, like the ſulphate, by mixing together ſolutions of the muriates of magneſia and of ammonia; or by partially decompoſing muriate of magneſia, with exceſs of acid, by means of ammonia. Its cryſtals are ſmall and irregular. It is much leſs ſoluble than either of the ſalts of which it is compounded, requiring ſix parts of cold water, and a ſmaller proportion of boiling water for its ſolution. It is decompoſed by heat; and it conſiſts of

27 parts muriate of ammonia,
73 —— muriate of magneſia.

100

VII. Hyperoxymuriate *of* Magnesia.

(1573.) Is formed in the ſame way as the hyperoxymuriate of lime, and reſembles it in moſt of its properties.—Its conſtituents are,

65·0 acid,
25·7 magneſia,
14·3 water.

100

VIII. Oxymuriate *of* Magnesia.

(1574.) May be formed in the dry way, in the ſame manner as the oxymuriate of lime.—We have not heard whether this ſalt has been tried in bleaching.

IX. FLUATE *of* MAGNESIA.

(1575.) Is formed by directing a ſtream of fluoric acid gas, through water, in which is ſuſpended magneſia; or by ſaturating magneſia with fluoric acid in liquid ſolution with water.

(1576.) *A fluate of magneſia-and-ammonia* may alſo be obtained by the means pointed out in the laſt article.

X. BORATE *of* MAGNESIA.

(1577.) Is formed by ſaturating magneſia with boracic acid. The combination takes place very ſlowly; and on evaporating the ſolution, cryſtals are obtained, which are ſmall and irregular.

(1578.) *A Borate of Magneſia-and-Lime,* has been lately found native in the mountain of Kalk-berg near Luneburgh, in Germany. It is in the form of white or tranſparent cubical cryſtals, having their edges and four of their angles truncated. It is ſo hard as to ſtrike fire with ſteel, and to ſcratch glaſs. Its ſpecific gravity is 2·566. It is electrified by heat, the oppoſite angles being poſitive and negative. It is inſoluble even in boiling water. By an exceſſive heat it melts into a yellow coloured glaſs. Its conſtituents, according to Weſtrumb, are,

Boracic acid,	73·5
Magneſia,	14·6
Lime,	11·9
	100

XI. PHOSPHATE *of* MAGNESIA.

(1579.) May be formed by ſaturating magneſia with phoſphoric acid, or by mixing equal parts of the ſolutions of phoſphate of ſoda and ſulphate of magneſia. In a few hours the acids exchange their baſes, and large tranſparent cryſtals of phoſphate of magneſia are formed, in ſix-ſided priſms of unequal ſides. This ſalt has little taſte, its ſpecific gravity is 1·5489. It is ſoluble in 15 parts of cold, and more ſoluble in boiling water. It effloreſces in the air and falls to powder. With a ſtrong heat it melts into a tranſparent glaſs.

XII. PHOSPHATE *of* MAGNESIA-AND-AMMONIA.

(1580.) This ſalt was firſt diſcovered by Fourcroy in a calcalous concretion found in the colon of a horſe. It has ſince been diſcovered in human urine. When urine is long kept in cloſe veſſels, it depoſits this ſalt on the bottom and ſides of the veſſel, in ſmall four-ſided priſmatic cryſtals, which are terminated by irregular four-ſided pyramids. It may alſo be formed by mixing aqueous ſolutions of the phoſphate of ammonia and magneſia, when the triple ſalt formed drops down in powder. It is ſcarcely ſoluble in water. Heated it gives out ammonia, and heated with charcoal it yields phoſphorus. With exceſſive heat it melts into tranſparent glaſs.—According to Fourcroy, the ſalt found in the concretion of the horſe, conſiſted of

33	phoſphate of magneſia,
33	phoſphate of ammonia,
33	water.
99	

XIII. PHOSPHITE *of* MAGNESIA.

(1581.) May be formed by combining magneſia with the phoſphorous acid; or by mixing aqueous ſolutions of the phoſphites of ſoda or of potaſh, with ſulphate of magneſia. This ſalt has no taſte; its cryſtals are tetrahedrons. It is ſoluble in 400 times its weight of cold water; it effloreſces and parts with its water in the air; with heat it melts into glaſs.—Its conſtituents are,

Phoſphorous acid,	44
Magneſia,	20
Water,	36
	100

(1582.) A *phoſphite of magneſia-and-ammonia* may alſo be formed by the means pointed out for producing other ſimilar triple compounds. This triple compound forms cryſtals, which are hardly ſoluble in water. Its properties have not been much examined.

XIV. CARBONATE *of* MAGNESIA.

(1583.) The compoſition of this ſalt was firſt diſcovered by Dr Black. Like the carbonates of lime it exiſts in two ſtates, a *ſubcarbonate*, and a *carbonate*. In the firſt the magneſian baſe is in exceſs, in the laſt the carbonic acid.

(1584.) The *ſubcarbonate* is uſually formed by mixing aqueous ſolutions of ſulphate of magneſia and of potaſh with heat. The white powder which is thus precipitated, forms the *magneſia alba* of commerce. According to Kirwan it is compoſed of

34	carbonic acid,
45	magneſia,
21	water.
100	

(1585.) The *carbonate* may be obtained by diffuſing the *ſubcarbonate* in water, and paſſing a ſtream of carbonic acid gas through it until it be ſaturated and diſſolved. Or it may be obtained by mixing 125 parts of ſulphate of magneſia with 136 parts of carbonate of ſoda, both diſſolved in water. The mixture being filtered and ſet aſide, in a few days the carbonate of magneſia cryſtallizes. The cryſtals are tranſparent hexagonal priſms, terminated by a hexagonal plane, arranged partly in groups, partly detached. This ſalt has little taſte. Its ſpecific gravity in powder, is only 0·2941. Its cryſtals are ſoluble in 48 parts of cold water; but its powder requires at leaſt ten times as much water.—It effloreſces, and falls to powder in the air; by heat it is decompoſed. Its conſtituents, according to Fourcroy and Kirwan, are,

Carbonic acid,	50
Magneſia,	25
Water,	25
	100

(1586.) Magneſia combines, and forms ſalts, with all the other acids. But as theſe have not been particularly examined, and have been applied to no uſe, we deem it unneceſſary to enter into a deſcription of them.

(1587.) Having finiſhed the conſideration of the alkaline earths, it may be obſerved that many chemiſts have long ſuſpected that theſe earths, as well

II. Alum.

(1605.) This ſalt and its uſes were firſt diſcovered by the Aſiatics, at a very remote period. It abounds at St Roche in Syria, whence the name of *Roche* or *Rock alum* is derived. Vauquelin and Chaptal have lately diſcovered it to be a triple ſalt, conſiſting of ſulphuric acid, alumina, and an alkali combined together. It does not ſeem to be of much importance whether the alkali be ſoda, potaſh, or ammonia; but a portion of one, two, or all of theſe alkalies, always enters into the compoſition of alum. Without this only the *ſulphate of alumina* is formed, which does not exhibit the properties of alum.

(1606.) The alum of commerce cryſtallizes in regular octahedrons, conſiſting of two four-ſided pyramids applied baſe to baſe. The ſides are equilateral triangles. Often it ſhoots into long four-ſided columns, which are tranſverſely ſulcated, and terminate in a maſſy four-ſided pyramid, each ſide of which is an equilateral triangle. It always reddens vegetable blues, ſhewing that the acid is in exceſs. It has a ſweetiſh but very aſtringent taſte. Its ſpecific gravity is 1·7109. It is ſoluble in from 15 to 20 parts of water at 60°, and in ¾ths of its weight of boiling water. Its cryſtals ſlightly effloreſce in the air, and loſe part of their water. When heated they melt in their water of cryſtallization; and when ſtrongly heated they ſwell and loſe about 44 *per cent.* of their weight, conſiſting chiefly of their water of cryſtallization. The white porous maſs which remains, is called *burnt* or *calcined* alum, and is often uſed as a corroſive. A violent heat expels moſt of the acid from alum, leaving its baſes in exceſs.

(1607.) We obſerved that it does not ſeem to be of much importance which of the alkalies are employed in the compoſition of alum, and Vauquelin, who analyſed ſpecimens manufactured in various countries, found they all contained nearly the ſame proportion of ingredients. According to the medium reſult of his experiments, alum contains

Sulphuric acid,	30·52
Alumina,	10·50
Potaſh,	10·40
Water,	48·58
	100

Cubic Alum.

(1608.) If an alkali be added to alum in *exceſs*, it forms a variety of alum which cryſtallizes in cubes. Chaptal obſerved that if the alkali be added in ſtill greater exceſs, the compound does not cryſtallize at all, but falls down in flakes. Theſe conſtitute alum with *exceſs of alkali*.

Neutral Alum.

(1609.) If a ſolution of alum be boiled with pure alumina, an additional doſe of alumina combines with it, and as it combines it precipitates in the form of a white powder. This compound was formerly denominated *alum ſaturated with its earth*. It is inſoluble in water, and is always in the form of a taſteleſs powder. Sulphuric acid converts it into alum. Chaptal informs us that alum is capable of combining with ſeveral other baſes, and of forming many triple ſalts, the properties of which have not been attentively examined.

Manufacture of Alum.

(1610.) This ſalt being univerſally uſed as a mordant in the fixation of colours, and for various important purpoſes in the arts, it may not be improper to offer a few remarks on the modes by which it is manufactured, and prepared for uſe.

(1611.) It is formed from a ſpecies of ſchiſtus, of a dark grey, dark blue, or black colour, which uſually accompanies pit-coal. It is called ſchiſtus becauſe it divides into thin beds, like ſlates, and it derives its colour from a mixture of bitumen and coal-culm. Theſe aluminous ſchiſti are every where compoſed of nearly the ſame materials, namely alumina, ſulphur, bitumen, iron, lime, magneſia. Where theſe beds of ſchiſtus are expoſed to the air, we can judge, pretty accurately, of their capacity to form alum, from the quantity and kind of effloreſcence which appears upon their ſurface. At Solfatara in Italy, alum effloreſces and is formed in lava, which ſeems to have been beds of this ſchiſtus before it erupted from the volcano. In ſome caſes the materials contain ſuch a proportion of potaſh as to form alum, without any addition of an alkali. In moſt caſes the materials only effloreſce into ſulphate of alumina (1603), and a ſufficient proportion of alkali muſt be added in the progreſs of the manufacture. When the aluminous ſchiſtus is long expoſed to the air, the ſulphur combines with oxygen, forming *ſulphuric acid;* and this combining with alumina, forms *ſulphate of alumina*. In many caſes the aluminous ſchiſtus is expoſed to a ſlow and ſmouldering inflammation, by which its ſulphur is oxygenated, and converted into acid. In Italy and other volcanic countries the oxygenation of the ſulphur is effected by volcanic fire.

(1612.) There are extenſive alum manufactories in Yorkſhire, and various parts of England. There the aluminous ſchiſtus is commonly burnt in very large heaps, conſtructed on a circular wall of maſonry, and having a fire of coals or bruſhwood kindled below it. The bitumen in its compoſition enables it to burn of itſelf, after it is fairly ſet on fire. After it is burnt, it is thrown into reſervoirs of water, where it undergoes three waſhings in order to extract the ſulphate of alumina from it.

(1613.) Though the aluminous ſchiſtus abounds in various parts of Scotland, and is even found in great abundance and perfection at Brora in the county of Sutherland, and in various parts of the iſland of Skye, we have only one manufacture of alum in this country, lately eſtabliſhed at Hurlet near Paiſley. There the ſchiſtus being taken from the waſte of a coal-pit, where it had been long expoſed to the air, is already much effloreſced into ſulphate of alumina, and is not burnt. It is laid up in long heaps, on a ſloping piece of clay ground, below which ſubterraneous drains conduct all the water which percolates through it into reſervoirs at the bottom of the declivity. A water-mill pumps back the ſolution of ſulphate of alumina, and conveys it by ſpouts over the heaps of ſchiſtus, repeatedly, until it be ſtrongly impregnated with the ſulphate of alumina. It is then let into other reſervoirs, where it is purified from its mud and ſediment, and afterwards boiled in large leaden boilers. The proper proportion of alkali is then added, which is commonly obtained from the refuſe of ſoap-boilers; and after the ſolution is evaporated until a drop thrown upon a cold ſtone forms cryſtals, it is let into large coolers of ſtone or wood, to cryſtallize. The lixivium now contains two ſalts, namely *alum* and *ſulphate of iron*. The alum cryſtallizes firſt, and a great part of the ſulphate of iron is drawn off while it ſtill retains its liquid ſtate. The ſulphate of iron, or *copperas*, does no harm to alum in thoſe dyeing proceſſes where ſulphate of iron is employed. But in order to get rid of it, this alum is ſubjected to five ſucceſſive ſolutions and cryſtallizations. Between each ſolution the cryſtals are pounded on an inclined ſlab, and are waſhed with water. The ſulphate of iron, being much more ſoluble than the alum, is waſhed away; and thus the alum is entirely freed of it. The laſt cryſtallization is performed in tall cylindrical veſſels, compoſed of ſtrong ſtaves hooped together. Theſe veſſels being filled with the hot liquid alum, it conſolidates on cooling. On knocking off the hoops and removing the ſtaves, the alum forms a cylindrical column, which is broken in pieces. Its inſide is found to be hollow, with numerous beautiful ſhining cryſtals projected into it.

ARTIFICIAL ALUM.

(1614.) Chaptal diſcovered a method, and procured the eſtabliſhment of manufactories in France, for making artificial alum.—In one of theſe manufactories at Javelle, fine clay is firſt calcined, and then reduced to powder in a mill. It is then mixed with a ſuitable proportion of ſulphuric acid, and after remaining a few days, it is heated during 24 hours in an oven. The acid thus combines with the alumina in the clay, forming ſulphate of alumina; which being extracted from the maſs by lixiviation, has a proper proportion of urine, or of potaſh added, and is cryſtallized into alum.

(1615.) At Montpelier the clay is kneaded and mixed with half its weight of ſulphate of potaſh. It is then made into balls and calcined, and afterwards ſprinkled with its own weight of ſulphuric acid of 40 degrees of ſtrength; by which it is ſoon converted into alum.

(1616.) Chaptal has eſtabliſhed another proceſs at Thernes near Paris. One hundred parts of clay are mixed with 50 of nitre, and 50 of ſulphuric acid at 40 degrees of ſtrength. The materials being put into a ſtill, the nitric acid is diſtilled over, and alum is obtained from the reſidue by lixiviation. Chaptal recommends this proceſs as combining the manufacture of nitric acid with the formation of alum. In all theſe proceſſes the proportions of the ingredients ought to vary according to the purity of the clay.

HOMBERG'S PYROPHORUS.

(1617.) Is made by mixing three parts of alum and one of flour, or ſugar, and melting them together in an iron ladle until the mixture becomes blackiſh and ceaſes to ſwell. It is then reduced to powder, and put into a phial which is placed in a ſand-bath, and heated until a blue flame iſſues from the mouth of the phial for about a minute. The ſand-bath is now removed from the fire, and the neck of the phial is cloſed by a cork. This preparation was diſcovered accidentally by Homberg about the beginning of the 18th century, and hence paſſes under the name of *Homberg's pyrophorus*. If a little of it be taken out of the phial, it takes fire, and becomes red hot, eſpecially if the air be moiſt.—Scheele proved that alum deprived of potaſh does not make pyrophorus, and that ſulphate of potaſh may be ſubſtituted for alum. Mr Prouſt ſhewed that the reſiduum of ſeveral other ſalts compoſed of vegetable acids and earths, after being diſtilled from a retort by a ſtrong fire, takes fire on expoſure to the air. It would ſeem that in the pyrophorus the ſulphuric acid is partly decompoſed. It is thought the ſulphuret of potaſh, formed by this decompoſition, produces the igniting temperature by ſuddenly conſolidating water. The charcoal being divided in very minute particles, and raiſed to the point of ignition, combines with oxygen, which is known to enter into combination during the combuſtion of the pyrophorus.

(1618.) The uſes of alum are very various. In medicine it is employed as an aſtringent and ſtyptic. It is extenſively uſed in bleaching, dyeing, calico printing, tanning, paper making, and other arts. Wood that has been ſteeped in a ſolution of alum is not apt to take fire; and it has often been propoſed to preſerve houſes and ſhips from fire, by waſhing their inſide with ſolution of alum.

III. SULPHITE *of* ALUMINA.

(1619.) Is formed by directing a ſtream of the ſulphurous acid gas through water in which pure alumina is ſuſpended. It is inſoluble in water, and by expoſure to the air is gradually converted into ſulphate. It is compoſed of

Sulphurous acid,	32
Alumina,	44
Water,	24
	100

IV. NITRATE *of* ALUMINA.

(1620.) Is formed by diſſolving alumina in nitric acid, and evaporating until the ſalt cryſtallizes. It cryſtallizes with difficulty in thin ſoft plates, which have an acid and aſtringent taſte, and ſpecific gravity of 1·645. This ſalt has always an exceſs of acid, and is very ſoluble in water. It deliqueſces when expoſed to the air. Expoſed to heat, it parts with the acid, and the earth remains pure. The ſalt has never been applied to any uſe.

V. MURIATE *of* ALUMINA.

(1621.) Is formed by diſſolving alumina in the muriatic acid. The acid is always in exceſs. The ſalt is commonly gelatinous, or in the form of white powder. Pure alcohol diſſolves half its weight of this ſalt, and, when boiling, two thirds of its weight. Heated it melts and loſes its acid, and the alumina remains pure. It is of an aſtringent and ſharp taſte; reddens the tincture of violets, and deliqueſces in the air. Its conſtituents, according to Bucholz, are,

Muriatic acid,	19
Alumina,	30
Water,	51
	100

VI. FLUATE *of* ALUMINA.
VII. BORATE *of* ALUMINA.
VIII. PHOSPHATE *of* ALUMINA.
IX. PHOSPHITE *of* ALUMINA.

(1622.) Theſe ſalts may be formed; but as they have not been accurately examined, and have not been applied to any uſe, we forbear entering into any deſcription of them.

X. CARBONATE *of* ALUMINA.

(1623.) Chemiſts are divided in opinion concerning the exiſtence of this ſalt. Bergman was not able to form it artificially; but he obſerved that when alum was decompoſed by means of an alkaline carbonate, part of the alumina remained in ſolution until the carbonic acid was expelled. But this is probably a triple compound of alumina, carbonic acid, and the alkali employed in the precipitation. Sauſſure has ſhewn that water impregnated with carbonic acid, diſſolves alumina; but the acid flies off when expoſed to the air. Clay, which is a compound of ſilica and alumina, in ſome caſes efferveſces when treated with acids, without containing any lime; and this property is aſcribed to carbonic acid combined with the alumina. But this property they loſe on being dried, or gently heated.—It appears then that carbonic acid forms but a very weak adheſion to alumina.

(1624.) The metallic acids alſo combine with alumina, and form ſalts which have not been much examined, and which, therefore, it ſeems unneceſſary to deſcribe.

XI. ACETATE *of* ALUMINA.

(1625.) This combination of the acetic acid with alumina may be formed by digeſting alumina recently precipitated from alum, in acetic acid. By evaporation it cryſtallizes in the ſhape of needles; has a ſharp aſtringent taſte, and is very deliqueſcent. Its ſpecific gravity is 1·245.—Its conſtituents are, according to

	Richter,	*Wenzel.*
Acetic acid,	73·81	92·06
Alumina,	26·19	7·94
	100	100

XII. ACETATE *of* ALUMINA-AND-POTASH.

(1626.) This ſalt might be more properly denominated *Acetic Alum*, as it conſiſts of the alumina and alkali which form the baſis of common alum, combined with acetic acid. Like alum, no perceptible difference can be obſerved in its properties, whatever be the ſpecies of alkali which enters into its compoſition. This ſalt has never attracted the notice of chemiſts; but it has long been employed by the dyers; and eſpecially by the calico printers, who uſe it in great quantities to fix and brighten their colours.

(1627.) This ſalt has not been formed by the direct union of its component ingredients, but by means of double affinity, as mentioned by way of illuſtration (119). The calico printers uſe acetate of lead, called *ſugar of lead*, to produce the double affinity. Having made a ſolution of ſugar of lead, and alſo of alum, in certain proportions, and in given quantities of water, the two ſolutions are mixed together. The ſulphuric acid of the alum combines with the lead, with which it forms an inſoluble compound, which goes to the bottom; while the acetic acid combines with the alumina and alkali which formed the baſis of the alum, forming *acetic alum*, which remains diſſolved in the liquor. In (119) we ſtated that this double affinity may be as effectually produced by the acetate of barytes, or the acetate of lime, as by the acetate of lead. We have tried it with the acetate of lime, and could perceive no difference in the effect whether this or acetate of lead was employed. In treating of lime, we pointed out the way of forming acetate of lime (1500); and as this ſalt is of eaſy formation, and much cheaper than ſugar of lead, we conceive it may be ſubſtituted, in performing this operation, in its place.

(1628.) The *acetic alum*, being always uſed in a liquid ſtate at the works where it is produced, no attempt has been made to obtain it in a cryſtallized form. It has the ſharp penetrating ſmell of acetic acid, mixed however with a diſagreeable aſtringency. Its taſte is alſo ſour and aſtringent. In it, as in common alum, the acid is evidently in exceſs.

(1629.) It is probable that ALUMS, or triple compounds of *alumina*, *alkali*, and *acid*, might be formed with ſeveral of the other acids, by means of double affinity; and that ſome of theſe compounds might prove uſeful in the arts. But as this ſubject has not attracted the notice of chemiſts, we forbear entering into it.

(1630.) Alumina alſo combines with moſt of the other vegetable and animal acids; but as the ſalts thus formed have not been particularly examined, and are applied to no uſe, we ſee no neceſſity for entering into a deſcription of them.

SECT. VI. SILICA.

(1631.) Silica is ſo called becauſe it abounds in the ſtone called *ſilex* or *flint*. It exiſts nearly pure in white ſilicious ſpar, which has obtained the unmeaning name of *quartz*. It is in a ſtill greater degree of purity in *rock cryſtal*, when it is tranſparent and cryſtallized. It often occurs in the ſtate of ſand. It has alſo obtained the name of *vitrifiable earth*, or *vitrifiable ſtone*, becauſe it fuſes along with the fixed alkalies, and forms glaſs. A great part of the mountains, and of the ſolid parts of our globe are compoſed of this earth, and it abounds more in nature, perhaps, than all the other earths taken together.

(1932.) To obtain ſilica in a ſtate of purity, heat a piece of quartz, or flint, to redneſs, and while red hot, plunge it into cold water. Then reduce the ſtone to powder, and mix in a crucible one part of the powder, with three parts of potaſh. Apply a heat ſufficient to melt the mixture completely. Diſſolve the maſs formed in water, and ſaturate the potaſh with muriatic acid. Reduce it by boiling, and the ſilica firſt becomes gelatinous, and then is precipitated in the form of fine powder. Let this powder be waſhed in large quantities of water, until all the muriate of potaſh be extracted. The powder when dried is ſilica in a ſtate of purity.

(1633.) Pure ſilica is a fine white powder, without either taſte or ſmell. It has a harſh feel as if it conſiſted of minute grains of ſand. Its ſpecific gravity is 2·66. Lavoiſier and Morveau expoſed it to a fire maintained by oxygen gas without melting, or alteration. It is ſoluble in 7000 parts of water when newly precipitated; but at other times it is inſoluble. It abſorbs one fourth of its weight of water, without allowing any to drop out; but the water readily evaporates. It does not change vegetable colours. When firſt precipitated from potaſh, by means of muriatic acid, it forms with water a tranſparent jelly; but the water ſoon evaporates. The paſte it forms with water has not the ſmalleſt ductility.

(1634.) Silica is found, in various parts of the world, in a cryſtallized form, and is then known by the name of *rock cryſtal*. When pure its cryſtals are tranſparent and colourleſs like glaſs. Their moſt uſual form is a ſix-ſided priſm, ſurmounted by ſix-ſided pyramids on one or both ends; and the angles of the priſm correſpond with thoſe of the pyramids. Their ſpecific gravity is 2·653. Bergman having diſſolved ſilica in fluoric acid, and left the ſolution undiſturbed for two years, found it had depoſited cryſtals, ſome of which were cubes with their angles truncated. Profeſſor Seigling of Erfurt having allowed a liquor of ſilicum much diluted with water, and which contained a ſuperabundance of alkali to remain undiſturbed in a glaſs veſſel during eight years, found in it cryſtals of ſilica in the form of tetrahedral pyramids, which were perfectly tranſparent, and ſo hard as to ſtrike fire with ſteel.

(1635.) Silica combines with the fixed alkalies, when boiled in their ſolutions, and when the quantity of alkali conſiderably exceeds that of ſilica. This compound was formerly called *liquor ſilicum*; but is now generally termed *ſilicated potaſh*, or *ſoda*. When the ſilica exceeds the alkali in quantity, the compound can only be formed by igneous fuſion; and it is tranſparent and colourleſs, like rock cryſtal; nor is it acted on by water, air, nor, excepting the fluoric, by acids. This compound is well known under the name of *glaſs*. Silica does not combine with the metals, but it unites with many of their oxides, forming various coloured glaſſes and enamels, which are often formed as imitations of the precious ſtones.

(1636.) Silica combines with barytes; and when barytes water is dropped into ſilicated potaſh, the two earths are precipitated in union with each other. Theſe earths alſo combine by means of heat; and the following experiments of Mr Kirwan will explain the effect of heat on various mixtures of ſilica and barytes.

Table.

Proportions.	*Heat.*	*Effect.*
80 Silica 20 Barytes	155° Wedg.	A white brittle maſs.
75 Silica 20 Barytes	150	A brittle hard maſs, ſemitranſparent at the edges.
66 Silica 33 Barytes	150	Melted into a hard, ſomewhat porous porcelain maſs.
50 Silica 50 Barytes	148	A hard maſs not melted.
20 Silica 80 Barytes	148	The edges were melted into a pale greeniſh matter between a porcelain and enamel.
25 Silica 75 Barytes	150	Melted into a ſomewhat porous porcelain maſs.
33 Silica 66 Barytes	150	Melted into a yellowiſh and partly greeniſh white porous porcelain.

(1637.) Silica alſo combines with ſtrontian and with lime. If lime water be poured into a ſolution of ſilicated potaſh, the ſilica is precipitated in union with lime. Silica and lime alſo combine by means of heat; and the following experiments of Mr Kirwan ſhew the effects of heat on various proportions of theſe earths.

Proportions.	*Heat.*	*Effect.*
50 Lime 50 Silica	150° Wedg.	Melted into a maſs of a white colour, ſemitranſparent at the edges, and ſtriking fire, though feebly, with ſteel: it was ſomewhat between porcelain and enamel.
80 Lime 20 Silica	156	A yellowiſh white looſe powder.
20 Lime 80 Silica	156	Not melted, formed a brittle maſs.

(1638.) Silica enters with difficulty into combination with magneſia; but when equal parts of theſe earths are expoſed to a very violent heat, they form a white enamel.

(1639.) Silica readily combines with alumina. When equal portions of ſilicated and aluminated potaſh are mixed together, they form a brown zone, which, by agitation is diffuſed through the liquor. After ſome time the mixture aſſumes the conſiſtence of jelly. When theſe two earths are formed into a paſte with water, and dried, they acquire a conſiderable degree of hardneſs. Expoſed to 160° of Wedgewood, they become very hard but do not melt; but an exceſſive heat converts them into an opaque glaſs, or rather enamel. Bricks, tiles, ſtoneware, and porcelain, are chiefly compoſed of various proportions of ſilica and alumina mixed and conſolidated by heat. The *clays* too are chiefly compoſed of various proportions of ſilica and alumina; though there are few of them but alſo contain extraneous ſubſtances. The finer ſpecies of ſtone ware, and porcelain, are formed by ſelecting the whiteſt and pureſt clays, and quartz or ſilex, reducing them to impalpable powder, mixing and forming them into a paſte with water. They can then be faſhioned into any ſhape required, and being ſlowly dried, and afterwards, ſubjected to exceſſive heat they acquire great hardneſs. In porcelain there is an incipient vitrification, which conveys to it a degree of tranſparency.

(1640.) Silica only forms compounds with a very few of the acids.

I. Muriate *of* Silica.

(1641.) When muriatic acid is poured into a ſolution of ſilica and potaſh (1632) part of the ſilica is thought by Fourcroy to combine with the acid. But it ſeems more probable that a triple compound is formed of muriatic acid, potaſh, and ſilica. This compound is tranſparent, and when concentrated by boiling, the ſilica ſeparates from it in the form of a jelly.

II. Fluate *of* Silica.

(1642.) Fluoric acid corrodes glaſs veſſels, and combines with ſilica, when either in the gaſeous or liquid ſtate. If a ſolution of this ſalt be allowed to remain a very long time in a veſſel not fully cloſed, it depoſits ſmall brilliant, tranſparent, rhomboidal cryſtals, which Fourcroy aſcertained to be fluate of ſilica. This ſalt is ſoluble in alkalies, and forms with them triple ſalts.

III. Borate *of* Silica.

(1643.) The boracic acid and ſilica, when expoſed to exceſſive heat, melt and form a tranſparent glaſs. Fourcroy has given the name of *borate of ſilica* to this glaſs. This compound is not altered by the air, has no taſte, and is inſoluble in water. There does not appear any good reaſon for ranking it in the claſs of ſalts.

IV. Phosphate *of* Silica.

(1644.) Is formed in the ſame way as the borate, by expoſing a mixture of phoſphoric acid and ſilica to a ſtrong heat. The mixture melts into a hard, denſe, and tranſparent glaſs. A mixture of this glaſs is employed in the fabrication of artificial gems. When expoſed to a ſtrong heat it unites with the fixed alkalies, and forms a triple compound. But there ſeems no reaſon for ranking this glaſs, any more than common glaſs, in the claſs of ſalts.

(1645.) It therefore appears that ſilica does not combine directly with any of the acids, excepting the fluoric.

Sect. VII. Yttria.

(1646.) This earth derives its name from the quarry of Ytterby in Sweden, in which a mineral was diſcovered about 1788, by Captain Arhenius, from which the earth was extracted, by Profeſſor Gadolin, in 1794. The mineralogiſts, from this circumſtance, have aſſigned to the mineral the name of *Gadolonite*. Many other chemiſts tried experiments on this mineral, the reſult of which was to confirm the experiments of Gadolin. As this mineral has not yet been diſcovered except at Ytterby in Sweden, it does not ſeem neceſſary to enter into a minute deſcription of it.

(1647.) To obtain Yttria in a pure ſtate, Gadolonite, or the mineral of Ytterby is reduced to powder, and treated with a mixture of nitric and muriatic acids, until it be completely decompoſed. The ſolution is filtered and evaporated nearly to dryneſs, then diluted with water, which diſcharges the ſilica from it. The liquid being again paſſed through a filter, is evapourated to dryneſs, and the reſidue heated for a conſiderable time to redneſs in a cloſe veſſel. It is then rediſſolved in water, and filtered. What paſſes through the filter is colourleſs; and by adding to it a ſolution of volatile alkali, pure Yttria is precipitated.

(1648.) Yttria thus obtained is a fine white powder, without taſte or ſmell. It is not melted by heat; has no effect upon vegetable blues; and is conſiderably heavier than any of the other earths, its ſpecific gravity, according to Ekeberg, being 4·842. It is inſoluble in water, and yet, like alumina, it retains a conſiderable proportion of that liquid. According to Klaproth 100 parts of Yttria, dried in a low temperature, loſe 31 parts of their weight of water, when heated to redneſs in a crucible.

(1649.) It is not ſoluble in pure alkalies; but readily diſſolves in all the alkaline carbonates. It combines with the acids, forming ſalts which have a ſweet, though an auſtere taſte. Some of the ſalts of Yttria have a beautiful red colour. In this reſpect it differs from all the other earths and alkalies, all of which form colourleſs ſalts with the acids.—This circumſtance, combined with the great weight of this earth, lead us to ſuſpect that it is not in fact a proper earth, but a metallic oxide, which means have not yet been diſcovered of decompoſing, and reducing to the metallic form. The metals are the heavieſt bodies with which we are acquainted, and it will be ſeen that they are the only claſs of bodies which form coloured ſalts with the acids. The ſweet and auſtere taſte of its ſalts, too, is an additional circumſtance which allies it with the metals, as a great proportion of the metallic ſalts poſſeſs a ſweet or an auſtere taſte.

(1650.) As few of the acid compounds of yttria have been formed, or particularly examined, and none of its ſalts have been applied to any uſe, we ſee no neceſſity for entering into an enumeration of them.

Sect. VIII. Glucina.

(1651.) This earth was diſcovered by Vauquelin, in 1798, while analyſing the beryl, at the requeſt of Hauy, with a view to aſcertain whether its component ingredients were the ſame with thoſe of the emerald. The conjecture of Hauy was not only confirmed, but a new earth was diſcovered which forms a conſiderable proportion in the compoſition of both theſe gems, and to which Vauquelin gave the name of *Glucina* from the Greek word *γλυκυς*, *ſweet.*

(1652.) To obtain glucina pure, the beryl, or the emerald, are reduced to powder, and fuſed in a crucible with thrice their weight of potaſh. The fuſed maſs is diluted with water, diſſolved in muriatic acid, and the ſolution evaporated to dryneſs. What remains has a great quantity of water added to it, which precipitates the ſilica, that conſtitutes more than half the weight of the ſtone. Being paſſed through a filter, the ſilica remains behind; while the glucina and other earths paſs through in ſolution by muriatic acid. Theſe earths are precipitated by carbonate of potaſh, the precipitate waſhed, and then diſſolved in ſulphuric acid. To the ſolution ſulphate of potaſh is added, and after it is evaporated to the proper conſiſtency, it is ſet by to cryſtallize. Cryſtals of alum are formed, and when as many as poſſible of theſe are removed, carbonate of ammonia, in exceſs, is poured into the liquor, which is then filtered and boiled for ſome time. A white powder gradually ſeparates, which is *Glucina.*

(1653.) Glucina, thus obtained, is a light, ſoft, and white powder, whoſe ſpecific gravity is 2·976. Like alumina it adheres to the tongue, and has neither taſte nor ſmell. It does not alter vegetable colours. It does not contract in its dimenſions by heat, like alumina, nor is it capable of fuſion. Though inſoluble in water, it forms a ſlightly ductile paſte with that liquid. Among the combuſtibles it is only ſoluble in ſulphureted hydrogen, with which it forms hydroſulphuret of glucina. It is inſoluble in ammonia, but is about five times more ſoluble in carbonate of ammonia than yttria.

(1654.) Glucina combines with all the acids, and forms with them ſalts which have a ſweet and ſlightly aſtringent taſte. In this property it agrees with yttria, though its ſalts are not ſo auſtere as thoſe of yttria.—The affinities of glucina with acids, as far as they have been aſcertained, are in the following order.

Sulphuric acid,
Nitric,
Muriatic,
Phoſphoric,
Fluoric,
Boracic,
Carbonic.

(1655.) The acid compounds of this earth, or the ſalts it forms, not having been accurately examined, nor applied to any uſe, it is not neceſſary to enter upon. It ſeems only proper to mention that the *muriate of Glucina*, formed by combining muriatic acid with this earth, when diſſolved in diluted alcohol, forms a very agreeable ſweet liquor.

Sect. IX. Zirconia.

(1656.) Klaproth firſt extracted this earth, in 1789, from a precious ſtone brought from the iſland of Ceylon, where it is known by the name of *jargon*, or *zircon*, from which he aſſigned the name of *zirconia* to this new earth. In 1795 he publiſhed an analyſis of the *hyacinth*, a ſtone from the ſame iſland, in which he alſo detected a large proportion of the ſame earth. This induced Guyton Morveau, in 1796, to examine the hyacinths of Expailly in France, and they were found to contain the ſame proportion of zirconia with thoſe of Ceylon. The properties of this new earth were farther illuſtrated by Vauquelin.

(1657.) To obtain zirconia pure, the ſtone called zircon, or the hyacinth, is reduced to powder, mixed with thrice its weight of potaſh, and melted in a crucible. The maſs is waſhed in pure water until the potaſh be ſeparated, and the remainder diſſolved as much as poſſible in weak muriatic acid. The ſolution being boiled to precipitate the ſilica, is filtered, and a quantity of potaſh, in ſolution, poured into it. The zirconia precipitates in the ſtate of a fine powder.

(1658.) Zirconia, thus obtained, is in the ſtate a fine white powder, ſomewhat harſh to the touch. Its ſpecific gravity is 4·3. It has neither taſte nor ſmell, does not change vegetable colours, and is inſoluble in water. But when dried ſlowly after being precipitated, it retains about a third of its weight of water, aſſumes a yellow colour, and a degree of tranſparency reſembling gum arabic. It is infuſible by heat; but when violently heated in a charcoal crucible, it aſſumes a grey colour, and acquires the hardneſs of porcelain. Like baked alumina, it alſo ceaſes to be ſoluble in acids. It does not combine with metals, but has a ſtrong affinity for metallic oxides, particularly for the oxide of iron, from which it is ſeparated with difficulty. It does not diſſolve in the pure alkalies, either by liquid ſolution, or igneous fuſion; but it is ſoluble in all the alkaline carbonates.

(1659.) Zirconia combines with all the acids, and forms with them ſalts, many of which are inſoluble in water, and thoſe which are ſoluble have a peculiar aſtringent taſte. But as this earth has not yet been found except in the precious ſtones called the zircon and hyacinth; is of difficult extraction; and is never likely to be found in ſufficient abundance: as only few of its ſalts have been examined with attention, and neither they nor the earth itſelf are ever likely to be applied to any uſe, we forbear entering into a deſcription of the ſalts it forms with acids.

(1600.) The affinities of zirconia for acids, as far as yet aſcertained, are in the following order.

Vegetable acids,
Sulphuric,
Muriatic,
Nitric.

(1661.) From the ſpecific gravity of this earth, and the peculiar taſte of its ſalts, we are led to indulge a conjecture that it may be diſcovered to be the oxide of a peculiar metal, which has not yet been preſented in the metallic form. Metallic oxides convey their peculiar colour to all the precious ſtones, as well as to thoſe coloured glaſſes which are formed in imitation of them. We are therefore diſpoſed to conſider it as the oxide which conveys their peculiar colour to the zircon and the hyacinth. Indeed we have frequently hinted a probability that all the earths are only metallic oxides, in which oxygen adheres with ſo much force as not to be ſeparable by any means yet diſcovered.—Mr Davy ſeems to be in a fair way of ſolving this problem.

DIVISION VII.

METALS.

(1662.) It does not ſeem poſſible that man could eſtabliſh any ſuperiority over the beaſts, or make any progreſs in the ſciences, or in the arts which contribute to the ſuſtenance or embelliſhment of human life, without ſome degree of knowledge of the properties and uſes of metals. So ſenſible were men of this in the early ages, that thoſe who were moſt ſucceſsful in the working of metals, were uniformly exalted to the rank of Gods. In later times the whole ſcience of chemiſtry was confined to them; and the rage for converting all the metals into gold, which prevailed among the alchemiſts, laid the foundation of all the improvements which this ſcience has ſince received.

(1663.) Metals are diſtinguiſhed from all other bodies by certain characteriſtic properties. Theſe may be comprehended under the following heads, namely, their
Luſtre, or brilliancy,
Opacity,
Fuſibility,
Weight,
Conducting power,
Hardneſs,
Elaſticity,
Malleability,
Ductility,
Tenacity.

(1664.) The *luſtre*, or brilliancy of metals is a property which diſtinguiſhes them ſo much, that it has acquired the name of the *metallic luſtre*. Some other bodies, ſuch as mica, blind or glance coal, and a few other ſpecies of coal, plumbago or graphite, &c. poſſeſs ſome degree of this luſtre, and are hence diſtinguiſhed by mineralogiſts as poſſeſſing what they are pleaſed to call the *metallic luſtre*. But an eye accuſtomed to diſtinguiſh can perceive a great difference between the luſtre of theſe bodies and that of metals; and the luſtre of the former ceaſes when ſcratched, or when broken down, while the luſtre of the metals continues to be exhibited by their minuteſt particles. It is this luſtre of the metals which qualifies them for being made into mirrors, and reflectors for teleſcopes.

(1665.) The *opacity* of metals conſiſts in their not admitting light to paſs through them. For the cauſe of opacity in bodies ſee (146.) But though metals be the moſt opaque bodies we know, they are not abſolutely opaque. Thus no light paſſes through the thinneſt ſilver leaf that can be formed; but if gold leaf, of $\frac{1}{180000}$th part of an inch in the thickneſs, be held between the eye and the light, it appears green, from which Newton inferred that it tranſmitted the green rays. He hence inferred that all other metals would tranſmit light if they could be rendered ſufficiently thin.—It is the opacity of metals, joined to the fine poliſh of which their ſurfaces are ſuſceptible, which qualifies them for being faſhioned into mirrors.

(1666.) The *fuſibility* of metals, or their capability of being melted, is another property which renders them highly uſeful. It enables us to caſt them in moulds, and to convey to them any ſhape we pleaſe. Some, ſuch as iron and others, may be made to aſſume the moſt elegant figures. The fuſibility of metals is very various. Mercury is always fluid, except at a very low temperature. Platinum does not melt except in the moſt exceſſive heat that we can apply.

(1667.) The *weight*, or *denſity* of metals is greater than that of any bodies with which we are acquainted. Antimony, among the lighteſt of them, is more than ſix times heavier than water; while platinum, the heavieſt, is 23 times heavier than water.

(1668.) The *conducting power* of metals refers to their tranſmiſſion of the electric fluid, which they tranſmit more freely than any other bodies.

(1669.) The *hardneſs* of metals is not very great in itſelf, but ſome of them, ſuch as ſteel, may be hardened by art ſo as to cut almoſt all other bodies. The ancients made their cutting inſtruments of a compoſition of copper and tin, by a proceſs which ſeems now to be loſt.—This property of metals renders them of great importance, not only in war, but in agriculture and the arts.

(1670.) The *elaſticity* of melals ſeems to depend on their hardneſs, and ſeems to increaſe as their hardneſs is increaſed. This is alſo a moſt important property of metals.

(1671. The *malleability* of metals is alſo an important property. This renders them capable of being hammered into any ſhape required, and this property is peculiar to metals. Heat increaſes their malleability, and metals become harder and denſer by hammering. All metals are not malleable; but all that were known to the ancients poſſeſs this property.

(1672.) The *ductility* of metals conſiſts in their being capable of being drawn through holes into wire. This property is not common to all the metals but is confined to a few.

(1673.) The *tenacity* of metals conſiſts in the power which a wire, or rod of metal, poſſeſſes of ſuſtaining a weight appended to it, without breaking. The different metals poſſeſs this power in very various degrees. Theſe may be conſidered as the properties which diſtinguiſh metals from all other bodies.

Combination *with* Oxygen.

(1674.) The moſt conſpicuous of all the combinations of the metals, is that which they form with oxygen. In this they are allied to combuſtible bodies; and ſome of the metals even take fire during their combination with oxygen. Metals combine with oxygen when expoſed to the joint action of heat and air; and a few which reſiſt heat and air, combine with oxygen in conſequence of the action of acids, eſpecially the ſulphuric, the nitric and muriatic acids, or a mixture of the two laſt. In conſequence of combining with oxygen, metals loſe their luſtre and malleability, and are gradually converted into powder every way reſembling earths. Theſe powders were formerly called *calces*; but are now diſtinguiſhed by the name of *oxides*. They are of various colours, according to the metal and the treatment, and are often manufactured in larger quantities to ſerve as paints.

Reduction.

(1675.) When metals are mixed with charcoal powder, and heated in a crucible, they part with the oxygen which had converted them into oxides, and are reduced again into their former ſtate of metals. Oil, tallow, hydrogen gas, and other combuſtibles may often be ſubſtituted for charcoal; and the combuſtibles, after the proceſs, are found to have undergone the ſame changes as if they had been burnt.

(1676.) To account for theſe phenomena ſeveral theories were advanced by different chemiſts. Stahl ſuppoſed there was a primitive earth which formed the baſis of all the metals, and that in the proceſs of reduction the inflammable bodies imparted phlogiſton to this earth. Beccher ſuppoſed another principle beſides phlogiſton entered into the compoſition of the metals, to which he gave the name of *mercurial earth*, becauſe he ſuppoſed it to abound moſt in mercury. Succeeding chemiſts found it neceſſary to diſcard the mercurial earth; and to conclude that metals are compoſed of the primitive earth only, united to phlogiſton. But as it was ſoon obſerved that the calces of metals differed from all the earths, and from each other, Bergman ſuppoſed that the ſame earth did not form the baſis of all the metals, but that each metal is compoſed of a peculiar earthy ſubſtance, combined with phlogiſton.

(1677.) Meanwhile a very important fact reſpecting calcination had been entirely overlooked: The oxides or calces of metals are all heavier than the metals from which they had been obtained. This fact had firſt been obſerved by Boyle, who aſcribed it to a quantity of fire becoming fixed in the metal during the proceſs of oxidation, or calcination. But Lavoiſier was the firſt perſon who illuſtrated this ſubject in a ſatisfactory manner, by his celebrated experiments on calcination, publiſhed in the memoirs of the Paris Academy in 1774. He put eight ounces of *tin* into a large glaſs retort, and then drew the point of it into a ſlender tube. The retort being heated until the tin began to melt, by which the air whoſe expanſion would have burſt the veſſel was expelled, it was ſealed hermetically by melting the point of the tube. The retort contained 250 cubic inches, and being weighed accurately, was again placed on the fire. The tin ſoon melted, and was partly converted into a *calx*, or *oxide*. After three hours, no more calcination took place. The retort was now found to be preciſely of the ſame weight it was before; therefore no new ſubſtance had been introduced, and the increaſed weight of calces could not be owing, as Boyle ſuppoſed, to the fixation of fire. On breaking the point of the retort, air ruſhed in equal to ten grains in weight. The metal and its calx were found to be juſt ten grains heavier than they were before. The part of the metal which remained unchanged could not have combined with this air; therefore ten grains of air muſt have entered into the compoſition of the calx. It follows then that the increaſe of weight which metals undergo during calcination, is owing to their uniting with air. But the calcination ſtopped at a certain point, before all the air in the veſſel was abſorbed. It was afterwards found that the reſidue of air after calcination had been performed in it is always pure *azotic gas*; and that only the *oxygen* combines with the metal, and forms it into an *oxide*, or *calx*.

(1678.) Lavoiſier afterwards aſcertained that the weight of the oxide was always equal to the weight of the metal employed, together with that of the *oxygen* abſorbed. Hence he concluded that the calcination of metals does not conſiſt in their parting with phlogiſton; but in their abſorption of oxygen; and that their reduction does not conſiſt in their abſorbing phlogiſton, but in giving out oxygen to ſome ſubſtance, ſuch as charcoal, for which it has a ſtronger affinity.

(1679.) The oxides of mercury, and of ſeveral other metals, are capable of being reduced, without the action of charcoal, or of inflammable ſubſtances. Thus if oxide of mercury be heated in a glaſs retort to which a pneumatic apparatus is attached, to the temperature of 1000°, it gives out oxygen gas, and returns to its metallic ſtate. The joint weights of the metal and of the oxygen gas, are preciſely equal to the weight of the oxide decompoſed. Gold, platinum, ſilver, nickel, and even lead may be reduced in this way. Other oxides, ſuch as thoſe of manganeſe, zinc, and iron, may be brought nearer the metallic ſtate, but cannot be fully reduced by heat alone. Hence it follows that in the *reduction* of a metal, no other perceptible event takes place but the extrication of the oxygen which had combined with the metal during its *oxidizement*.

(1680.) Even of thoſe oxides of metals which require a mixture of charcoal to ſeparate oxygen from them, if the product be collected in a pneumatic apparatus, during the proceſs of reduction, carbonic acid and carbonic oxide gaſs come over, ſhewing that theſe oxides are compoſed of the metal combined with oxygen. The weight of theſe gaſes, together with that of the reduced metal, are preciſely equal to the original weight of the oxide and charcoal; ſhewing that theſe gaſes had been formed from the combination of the charcoal with the oxygen of the oxide. In the ſame way, if a ſtream of hydrogen gas be conveyed through oxide of iron, and ſeveral other oxides, highly heated in a porcelain tube, water is formed, and the oxide is reduced to its metallic form.

(1681.) We muſt therefore conſider metals as ſimple ſubſtances, becauſe their compoſition has not been proved. When they combine with oxigen, they form *oxides*, and *oxidation*, or rather *oxidizement* is the act of this combination. When they are made to part with oxygen, they revert to their ſimple ſtate of metals, and *reduction* is the word by which this proceſs is denoted. Metals like combuſtibles, are capable of combining with different doſes of oxygen, and ſome of them even paſs from the claſs of oxides to that of acids. The loweſt combination of oxygen with a metal is called *protoxide*, and the higheſt a *peroxide*.

Combination with Combustibles.

(1682.) Metals combine with the ſimple combuſtibles, and theſe compounds are diſtinguiſhed by adding the termination *uret* to the name of the combuſtible. Thus the compounds which ſulphur, phoſphurus, or carbon form with metals, are called the *ſulphuret*, *phoſphuret*, or *carburet* of the metal. Theſe compounds are generally ſolid; but when metals combine with hydrogen gas, the product is generally elaſtic or in ſolution, and is indicated by an epithet denoting the metal prefixed to hydrogen gas. Thus *arſenical hydrogen gas*, denotes arſenic diſſolved in hydrogen. The ſimple incombuſtibles are not known to combine with metals.

Combination of Metals with Metals.

(1683.) Metals combine readily with each other, and this property increaſes their utility in the formation of inſtruments. Thus lead and tin form *pewter;* copper and zinc form *braſs;* copper and tin, *bell-metal*, &c. Such compounds are called *alloys;* but if one of the metals be mercury, the compounds are called *amalgams*. Thus a compound of mercury and tin, is called an *amalgam of tin*.

(1684.) The metals were formerly divided into the *noble* or *perfect*, and *imperfect metals*. They were alſo divided into *metals* and *ſemi-metals*. Theſe diſtinctions, however, are now neglected as uſeleſs. There were only ſeven metals known to the ancients, and 17 have been diſcovered ſince 1730. The number at preſent known amounts to 28. Some of the late diſcovered metals are very ſcarce, and not likely to be applied to any uſe. Different arrangements of the metals have been adopted by different authors; but we ſhall follow that laid down by the ingenious Dr Thomſon, who arranges them in the order of their *Malleability, Brittleneſs, and Fuſibility, &c.*

I. Malleable.

1. Gold,
2. Platinum,
3. Silver,
4. Mercury,
5. Palladium,
6. Rhodium,
7. Iridium,
8. Oſmium.
9. Copper,
10. Iron,
11. Nickel,
12. Tin,
13. Lead,
14. Zinc.

II. Brittle and easily Fused.

15. Biſmuth,
16. Antimony,
17. Tellurium,
18. Arſenic.

III. Brittle and difficultly Fused.

19. Cobalt,
20. Mangameſe,
21. Chromium,
22. Molybdenum,
23. Uranium,
24. Tungſten.

IV. Refractory.

25. Titanium,
26. Columbium,
27. Tantalium,
28. Cerium.

MALLEABLE METALS.

Sect. I. Gold.

(1685.) Gold is ſhewn by Dr Lewis to be very extenſively diſſeminated throughout nature, though in ſmall quantity, and as it is commonly found in its metallic form, it was probably the firſt metal that men diſcovered, or applied to uſe. Its ſcarcity and indeſtructibility, are the only circumſtances which have rendered it valuable, as a medium of exchange, or for ornament; but in uſeful applications it is far ſurpaſſed by iron.

(1686.) It is of an orange red, or reddiſh yellow colour, without taſte or ſmell. Its luſtre yields only to that of platinum, ſteel, ſilver, and mercury. Its ſpecific gravity is 19·2.

(1687.) Gold is ſeparated from other baſer metals with which it may be combined, by the proceſs of cupellation. The gold is melted with lead and placed in a cup compoſed chiefly of burnt bones or the aſhes of burnt wood, under a muffle, in a furnace. The lead being heated with acceſs of air, is firſt oxidiſed, then vitrifies, and carries down thro' the cup, or cupel, all the metals with which the gold was alloyed, except ſilver and platinum, while the gold is left pure.

(1688.) Bergman pointed out a method of ſeparating gold from thoſe ores in which it is combined with other metals. The gold being diſſolved in nitro-muriatic acid, the ſilver drops down in union with muriatic acid, which is an inſoluble compound. The gold is then precipitated in fine powder by means of ſulphate of iron. After which iron is put into the liquor, which precipitates the copper. Gold is found in greateſt plenty between the tropics. It is often diſſeminated in quartz, or ſiliceous ſpar, from which it is conveyed by torrents into the ſands of rivers, and is often found in the ſoil. Theſe ſands being well waſhed, to ſeparate extraneous matters, the common proceſs for extracting the gold is very ſimple. The purefied ſand is triturated with 10 or 12 times its weight of mercury, in a veſſel with water. The water being poured off, to carry away the earthy matters, the amalgam is ſqueezed in ſkins to preſs out the mercury. What remains ſolid is heated in ſtone retorts, to expel the remains of mercury, and the gold remains behind.

(1689.) Gold is the moſt malleable and ductile of all known ſubſtances. One grain of it, beaten into leaves, will cover 56¼ ſquare inches, and the thickneſs of theſe leaves is only $\frac{1}{180000}$th part of an inch. Gold put upon ſilver wire is only $\frac{1}{12}$th of that thickneſs, and an ounce of gold on ſilver wire may be extended more than 1300 miles in length. Its tenacity is ſuch that a gold wire 0·078 inch diameter will ſupport 150·07 lbs. avoirdupois, without breaking though its tenacity is inferior to that of iron, copper, platinum and ſilver. It melts at 32° of Wedgewood, and acquired a bluiſh green colour. It contracts while conſolidating, and hence is leſs fit for being caſt into moulds. It is a very fixed metal, and requires an exceſſive heat to volatilize it. But if a piece of ſilver be held over it while expoſed to exceſſive heat, the ſilver is coloured with gold, ſhewing that part had been volatilized. When ſlowly cooled after fuſion, it forms quadrangular pyramidal cryſtals.

(1690.) It is neither altered, nor loſes its luſtre, by expoſure to air or water. It does not combine with oxygen, ſo as to form an oxide, except in the focus of Tſchirnhaus's burning glaſs. But if an arrow ſlip of gold leaf be put between two plates of glaſs, and have a ſtrong ſhock of electricity paſſed through it, the gold is partially oxidized, and tinges the glaſs of a purple colour. Small ſlips of gold leaf, expoſed to the ſtream of a powerful Galvanic battery, are not not only oxidized, but diſſipated in vapour; while they burn with great brilliancy. Van Marum of Haerlem, having conveyed a ſhock of electricity through a gold wire from a powerful electrical machine, it burnt with a blue flame, and formed a purple oxide. The ſame experiment ſucceeded in gaſes which are not ſupporters of combuſtion, which muſt be aſcribed to the preſſure of water decompoſed by the electric fluid.

(1691.) There are two oxides of gold, which differ from each other in the proportions of oxygen that enter into their compoſition, and they are diſtinguiſhed by the names of *protoxide* and *peroxide*. The protoxide contains the loweſt proporportion of oxygen, and is of a purple or violet colour. The peroxide contains a greater propoportion of oxygen, and is of a yellow colour. This laſt can only be formed by means of acids.

(1692.) Equal parts of the nitric and muriatic acids being mixed together, are poured upon gold. A violent effervescence enſues becauſe the nitric acid furniſhes oxygen to the gold, and converts it into an oxide, and eſcapes through the liquid in the form of nitrous gas. The oxide thus formed is diſſolved by the muriatic acid.—This is the caſe with all ſolutions of metals in acids that they muſt firſt be converted into oxides, before an acid can diſſolve them.—The oxide of gold is precipitated from this ſolution by a ſolution of potaſh, or by dropping in lime water. Being waſhed and dried, it is inſoluble in water, and of a yellow colour. This oxide is much uſed for putting figures upon porcelain, for adorning looking glaſs frames, and other ornamental purpoſes. From 100 parts of gold, Bergman obtained 110 of precipitate. Hence it appears to contain about

91 gold
9 oxygen

100

When moderately heated it parts with ſome of its oxygen, and aſſumes a purple colour. With a ſtrong heat the whole oxygen is expelled, and the gold is reduced to its metallic ſtate.

(1693.) Gold combines with phoſphorus, when one part of gold filings, two parts of phoſphoric glaſs, and one eight part of charcoal are mixed and heated together in a crucible. The *phoſphuret* thus formed is whiter and more brittle than the gold, and has ſome appearance of cryſtallization. It may alſo be formed by adding phoſphorus to gold in a red heat in a crucible. This phoſphuret of gold contains $\frac{1}{24}$th part of phoſphorus. By keeping it ſome time in fuſion, the phoſphorus is expelled and inflamed, and the gold left in a pure ſtate.

(1694.) Sulphur does not act upon gold, nor is it ever found combined with this metal in its mineral ſtate, as is the caſe with moſt of the other metals. But Stahl diſcovered that if ſulphur, potaſh, and gold be heated together, and afterwards boiled in water, the gold will be diſſolved in the proportion of one part of gold to three of ſulphur, and three of potaſh.—This was formerly ſuppoſed to have been the method employed by Moſes for diſſolving gold. (12.)—The ſolution has a yellow colour. When an acid is dropped in, it combines with the potaſh, and the gold is precipitated in union with the ſulphur, in the ſtate of a reddiſh powder, which gradually becomes black. According to Bucholz, this powder contains about

82 gold
18 ſulphur

100

(1695.) Gold combines with various metals, and forms with them *alloys*. The order of its affinities for metals, according to Bergman, is the following:

Gold
Mercury,
Copper,
Silver,
Lead,
Biſmuth,
Tin,
Antimony,
Iron,
Platinum,
Zinc,
Nickel,
Arſenic,
Cobalt,
Manganeſe,

(1696. Gold is ſo ſoft that it is ſeldom employed except in the ſtate of alloy. Mr Hatchet obſerves that the moſt proper metals for alloying gold coin, are ſilver and copper. One twentieth part of ſilver ſenſibly changes the colour of gold, and when ſilver is mixed with it, the alloy is commonly called *pale gold*. The Britiſh and French coins conſiſt of 11 parts of gold to one of copper. The alloys of gold and iron are hard and brittle, and Dr Lewis formed ſome of them into cutting inſtruments. But one part of iron alloyed with 12 of gold, according to Mr Hatchet, is of a pale yellowiſh grey colour, and ſo ductile that it may be rolled and cut. Mercury combines with gold, either when cold, or aided by heat; and the amalgam it forms is much uſed in gilding. The other alloys of gold, being ſeldom or never uſed, do not ſeem deſerving of particular notice.

(1697.) Goldſmiths expreſs the purity of their gold in the following manner. Pure gold is ſuppoſed to be divided into 24 parts called *carats*. Gold of 24 carats then means pure gold, gold of 23 carats is gold which contains one part of ſome other metal: Gold of 22 carats is gold which contains 2 parts of ſome other metal, and ſo on. Thus the number of carats always indicates the proportion of gold in the alloy; and what this wants of 24 is the proportion of the other metal. In this country the carat is divided into 4 grains; among the Germans, into 12; and among the French it was was formerly divided into 32.

(1698.) The oxides of gold combine with acids forming Salts of Gold, according to Bergman, in the following order.

Oxide *of* Gold.

Muriatic acid,
Nitric,
Sulphuric,
Arſenic,
Fluoric,
Tartaric,
Phoſphoric,
Pruſſic.

The ſalts of gold are formed by diſſolving the yellow oxide of gold (1692) in an acid. As few of theſe ſalts have been particularly examined, we ſhall only notice thoſe which are moſt common.

I. Muriate *of* Gold.

(1699.) Is formed by diſſolving gold in nitro-muriatic acid (1691) or by diſſolving gold in oxy-muriatic acid. When the acid is ſaturated, the ſolution is of a deep yellow colour, very cauſtic, and of an aſtringent metallic taſte. It tinges the ſkin, and almoſt all animal and vegetable bodies, and even marble, of a deep and indelible purple colour. When the ſolution in the nitro-muriatic acid is evaporated, nitric acid is diſengaged, and the muriate of gold is obtained in ſmall cryſtals, having the form of four-ſided priſms, or truncated octahedrons. They are alſo of a fine yellow colour. They cryſtallize the more readily if the ſolution be evaporated to half its bulk, and have a little alcohol afterwards added to it.

(1700.) This ſalt is very ſoluble in water, and it deliqueſces, or becomes liquid by expoſure to the air. A ſtrong light conveys to it a red colour. When heated in a retort, muriatic acid paſſes over, and muriate of gold undecompoſed. It is more ſoluble in ether than in water; for when its aqueous ſolution is agitated with ether, the whole ſalt quits the water, and combines with the ether. The etherial ſolution has a yellow colour, and the gold is gradually reduced to its metallic ſtate, owing to the action of the ether upon it.

(1701.) Muriate of gold is decompoſed by ammonia, and the precipitate forms the fulminating gold, formerly deſcribed. It is alſo decompoſed by the alkaline earths, and the precipitate is the yellow oxide of gold (1692). Ammonia, and the fixed alkalies, if in ſufficient quantity, rediſſolve this oxide, probably forming triple ſalts, which have not been examined.

(1702.) The ingenious Mrs Fulhame aſcertained that liquid muriate of gold is decompoſed, and the gold is precipitated in its metallic ſtate, by hydrogen gas, phoſphorus, and ſulphurous acid. But if the muriate of gold be dry, this decompoſition does not happen. She accounts for the neceſſity of water to produce this effect, by ſuppoſing that the water is decompoſed. She ſuppoſes that the combuſtible combines with the oxygen of the water, while its hydrogen combines with the oxygen of the gold, and reproduces water. Tho' this lady's theory be very ingenious, it ſeems to require farther examination. Some think that the only effect of the water is to expoſe the oxide of gold in a ſtate of minute diviſion, to the action of theſe combuſtibles.

(1703.) Mrs Fulhame found that if a piece of ſilk be dipped in a ſolution of gold in nitro-muriatic acid, and then be immerſed, or expoſed to a ſtream of hydrogen gas, while moiſt, the gold is reduced, and adheres to the ſilk in its metallic form. But if the ſilk be previouſly dried, no reduction takes place. Or if a piece of ſilk be moiſtened with phoſphureted ether, and then be dipped into the nitro-muriatic ſolution of gold, its ſurface is immediately gilt with a fine coat of gold, which adheres very ſtrongly. Thus this lady has invented a method of dyeing, or rather of ingraining cloths with gold, which may be laid on in the form of ſtars, ſpangles, flowers, or any fancy figures that are moſt agreeable. She alſo obſerved that if a ſtick of phoſphorus be immerſed in a ſolution of gold, it is ſoon coated with a caſe of gold, which may be ſeparated by diſſolving the phoſphorus in hot water. In the ſame manner ſhe found that the fumes of burning ſulphur, the ſulphureted and phoſphoreted hydrogen gaſes, and the ſulphurous acid gas, reduced gold to its metallic form, provided the muriate of gold was in ſolution in water.

(1704.) Almoſt all the other metals occaſion a precipitation of gold, either in its metallic ſtate, or in that of its purple oxide, when they are plunged into the ſolution of muriate of gold. Thus zinc, iron, biſmuth, copper, and mercury, precipitate gold in its metallic ſtate, lead, ſilver, and tin, precipitate it in the ſtate of purple oxide. The ſulphate of iron precipitates gold in its metallic ſtate, and is itſelf converted into an *oxy-ſulphate*, by abſorbing the oxygen from the gold. But the oxy-ſulphate of iron produces no effect. The muriate of tin alſo precipitates gold in the ſtate of purple oxide; but the *oxy-muriate* of tin produces no effect, becauſe it is already ſaturated with oxygen, and can abſorb none from the gold. It ſhould ſeem then that gold exiſts in its muriate in the ſtate of *peroxide*, or combined with the higheſt doſe of oxygen it can abſorb, and that it cannot be precipitated by metals or their oxides, unleſs the whole, or a conſiderable part of its oxygen be abſtracted.

(1705.) The precipitate of gold by tin is uſually prepared by adding a ſolution of muriate of tin, recently formed, to a ſolution of muriate of gold. This is called the *purple precipitate*, or the *purple powder of Caſſius*. This precipitate is uſed to give a red colour to porcelain and glaſs, and it alſo dyes ſilk of a purple colour. Theſe precipitates of gold are alſo fuſed with glaſs, to form imitations of the precious ſtones; and the yellow precipitate (1692) is employed to convey to glaſs the peculiar colour of the topaz. The precipitates of gold are alſo employed in the formation of enamels, of various colours.

II. Nitrate *of* Gold.

(1705.) This ſalt was firſt diſcovered by Brandt, and it is formed by digeſting nitrous acid, which contains a large portion of nitric oxide upon gold-leaf, with the aſſiſtance of heat. The nitric oxide furniſhes oxygen to the gold, and its oxide is diſſolved in the nitric acid. This ſalt is decompoſed both by light and heat, and hence cannot be evaporated to dryneſs. It is alſo decompoſed by the muriatic acid, which ſeizes upon the oxide of gold, and ſets looſe nitric acid.

SECT. II. PLATINUM.

(1707.) This was only known in Europe, as a diſtinct metal, after the year 1749. It has not been found except in Spaniſh America, in Choco in Peru, and in the mine of Santa Fe near Carthagena. It has been inveſtigated by a great number of chemiſts of the firſt eminence, and its properties aſcertained with conſiderable accuracy.

(1708.) When it firſt comes from America it is in ſmall grains of a ſilvery luſtre. But in this ſtate it is very impure, as it contains no leſs than nine other metals, either chemically combined, or mechanically mixed. To obtain platinum in a tolerably pure ſtate, the grains are diſſolved in diluted nitro-muriatic acid, with as little heat as poſſible. The ſolution is decanted from a black matter, which reſiſts the action of the acid, and a ſolution of *ſal-ammoniac* is dropped into it. An orange-coloured precipitate falls to the bottom. This precipitate is waſhed, dried, and expoſed to a heat ſlowly raiſed to redneſs in a porcelain crucible. The powder which remains is nearly pure. It may be rendered ſtill more pure by rediſſolving it a ſecond, third, or even a fourth time in nitro-muriatic acid, and proceeding with each ſolution as above directed. The powder thus obtained cannot be made to coaleſce by fuſion, in any heat we can apply; but if wrapt up in a thin leaf of platinum, heated to redneſs, and cautiouſly hammered, the whole may be formed into a conſolidated maſs.

(1709.) Platinum, thus obtained, is white, like ſilver, but leſs bright. After being hammered, its ſpecific gravity is 23·000; and it is by far the heavieſt body with which we are acquainted. The ſpecific gravity varies according to the purity of the metal, and the degree of hammering it has undergone; and there is no metal about whoſe ſpecific gravity chemiſts are ſo much divided. Chabaneau found the ſpecific gravity of very pure and hammered platinum to be no leſs than 24. Lewis, who operated on impure ſpecimens, did not find its ſpecific gravity greater than that of gold. Other chemiſts have varied between the ſpecific gravity of gold, and 24.—but we believe our ſtatement, being that of the accurate Kirwan, to be neareſt the truth.

(1710.) Platinum is only inferior to gold in malleablility and ductility. It may be hammered into very thin plates, and drawn into wires not exceeding $\frac{1}{1940}$th of an inch in diameter. Its tenacity is next to that of iron, the only other welding metal. A wire of platinum 0·078 inch diameter, ſupports 274·31 lbs. avoirdupois without breaking. Air and water have not the ſmalleſt effect on platinum, any more than on gold.

(1711.) Platinum is a welding metal, and pieces of it may be welded together, by hammering, in the ſame way as iron. But this is among the moſt infuſible of all the metals. When alloyed with other metals, it may indeed be fuſed very eaſily. In its pure ſtate, Macquer and Baumé melted ſmall particles of it by means of the blow-pipe. Lavoiſier could only melt ſmall particles, when placed on red-hot charcoal, and expoſed to a ſtream of oxygen gas.

(1712.) The inflammability of this metal has not been tried in the current of a powerful Galvanic battery. Van Marum, having expoſed a wire of platinum, to the action of his powerful electrical machine, found it burnt with a white flame, and was diſſipated in white duſt, which proved to be oxide of platinum. Dr Thomſon, by putting a platinum wire into the flame produced by the combuſtion of a ſtream compoſed of a mixture of hydrogen and oxygen gas, cauſed it to burn with all the brilliancy of iron wire, and to emit ſparks in abundance. Theſe are the only methods by which this metal has been converted into an oxide by combuſtion; but the quantity of oxide, produced in this manner, is ſo ſmall that it cannot be collected or examined.

(1713.) To obtain the oxide of platinum, its ſolution in nitro-muriatic acid is treated with lime water, when a yellowiſh brown powder falls. This powder being diſſolved in nitric acid, evaporated to dryneſs, and expoſed to a heat ſufficient to expel the acid, a brown powder remains, which is the peroxide of platinum. This oxide is compoſed of

87	platinum,
13	oxygen,
100	

If the heat be very cautiouſly raiſed, only a part of the oxygen is ſeparated, and it aſſumes a green colour. This is the protoxide of platinum, which, according to Mr Chenevix is compoſed of

93	platinum,
7	oxygen,
100	

A red heat expels all the oxygen, and reduces platinum to its metallic ſtate.

(1714.) Of the ſimple combuſtibles, platinum only combines with ſulphur and phoſphorus. The phenomena of its combination with ſulphur, are ſimilar to thoſe of gold. The combination cannot be effected by heating the bodies together; but if a ſtream of ſulphureted hydrogen gas be paſſed through an acid ſolution of platinum, the metal is thrown down in dark brown flakes, in union with ſulphur. Mr Prouſt found this metal mineralized by ſulphur in its native ſtate.

(1715.) It readily combines with phoſphorus. Mr Pelletier mixed an ounce of phoſphoric glaſs, an ounce of platinum, and a dram of powdered charcoal, and heated them to about 32° of Wedgewood, by which he formed a *phoſphuret of platinum* weighing more than an ounce. It was of a ſilver white colour, very brittle, and ſo hard as to ſtrike fire with ſteel. It was partly in the form of a button, and partly of cubic cryſtals. He alſo found that when phoſphorus was thrown upon red hot platinum, the metal melted, and formed a phoſphuret. When the phoſphuret of platinum is liquified by heat, the phoſphorus ſeparates, and burns upon the ſurface. Hence Mr Pelletier thought this might prove an eaſy method of purifying platinum.

(1716.) Platinum combines, and forms alloys, with moſt of the other metals. The only alloys of it which have been particularly examined, are thoſe it forms with gold. A very ſmall proportion of platinum deſtroys the colour of gold, and gives it the appearance of bell-metal, or rather tarniſhed ſilver. On the other hand, a conſiderable proportion of gold does not ſenſibly alter the colour and appearance of platinum. According to Klaproth, if the platinum exceed $\frac{1}{17}$th of the gold, the colour of the alloy is much paler than gold; but if the proportion of platinum be under $\frac{1}{17}$th, neither the colour nor ductility of the gold are ſenſibly altered. On the other hand one part of platinum fuſed with four parts of gold, can ſcarcely be diſtinguiſhed from pure platinum; nor does the colour of the gold begin to predominate until it conſtitutes eight-ninths of the alloy. If the quantity of platinum be under $\frac{1}{10}$th, it may be ſeparated from the gold by rolling the alloy into thin plates and digeſting it in nitric acid, which takes up the platinum, but does not attack the gold. If the proportion of platinum exceed $\frac{1}{10}$th, it cannot be completely ſeparated in that manner.

(1717.) It is probable the remarkable change produced upon the appearance of gold, by mixing it with platinum, may be the cauſe of the watchful jealouſy, of the Spaniſh government againſt working this metal, or bringing it in quantities to Europe. They ſeem to have been afraid leſt the reputation of their gold might ſuffer in conſequence of mixtures with platinum. But platinum is equally indeſtructible as gold; and being a welding metal, it is thought it might be faſhioned into cutting inſtruments much more valuable than thoſe of ſteel, as they would not be expoſed to ruſt. It might thus anſwer all the purpoſes of gold as a medium of commerce, while it ſerved many important uſes in the arts. Not being diſpoſed to melt, or to oxidize, in the moſt violent heat we can apply, it makes excellent crucibles for various chemical inveſtigations.

(1718.) The acids have no action on platinum, any more than on gold; but moſt of them combine with the *peroxide* of platinum, forming ſalts, a few of which may be noticed.

I. Sulphate *of* Platinum.

(1719.) The ſulphuric acid ſeparates the oxide of platinum from every other acid, when it is dropped in to a ſolution of theſe ſalts. The compound formed by the ſulphuric acid and the oxide, is inſoluble, and goes to the bottom. Mr Chenevix aſcertained that it conſiſts of

54·5 peroxide of platinum
45·5 ſulphuric acid and water.

100.

(1720.) The ſulphate of platinum forms triple compounds with potaſh, and with ammonia, the properties of which have not been particularly examined.

II. Nitrate *of* Platinum.

(1721.) The nitric acid does not diſſolve platinum except when it is alloyed with gold. But it readily diſſolves the peroxide, and forms with it nitrate of platinum, a ſalt whoſe properties have not been examined. When this ſalt is evaporated to dryneſs, there remains a ſub-nitrate, which Mr Chenevix aſcertained to be compoſed of

89 peroxide of platinum,
11 nitric acid and water.

100

(1722.) The nitrate of platinum alſo forms triple ſalts with potaſh, and with ammonia, which have not been examined.

III. Muriate *of* Platinum,

(1723.) May be formed by diſſolving platinum in the oxymuriatic acid. But it is more commonly formed by boiling on powdered platinum 16 parts of a liquid compoſed of one part of nitric, and three parts of muriatic acids. The nitric acid oxydizes the platinum, and is decompoſed with efferveſcence, while the muriatic acid diſſolves the oxide thus formed. Mr Chenevix aſcertained that hyperoxymuriatic gas is diſengaged during the proceſs. The ſolution is firſt yellow, and when completed, is of a very deep red or brown colour. It is very cauſtic, and tinges the ſkin, and other animal and vegetable ſubſtances of a deep brown colour, which is indelible. Hence this ſalt might be uſed as a dye. When ſufficiently evaporated, the ſolution yields very ſmall irregular cryſtals of muriate of platinum, of a reddiſh brown colour, which when waſhed and dried, are leſs ſoluble in water than ſulphate of lime. Heat decompoſes this ſalt by expelling the acid. This ſalt is compoſed of

70 peroxide of platinum,
30 muriatic acid and water.

100

(1724.) Muriate of platinum is decompoſed by ſoda; but if the ſoda be added in exceſs, the precipitate is re-diſſolved, and a triple ſalt formed, compoſed of *muriate of platinum and ſoda*. In the ſame manner the addition of potaſh to muriate of platinum, forms a triple ſalt, compoſed of *muriate of platinum and potaſh*.

(1725.) In the ſame manner, if ammonia be added to a ſolution of muriate of platinum, a triple ſalt is formed, conſiſting of *muriate of platinum and ammonia*. This triple ſalt cryſtallizes in ſmall grains, which are ſoluble in water. If potaſh be added to a ſolution of the muriate of platinum and ammonia, the oxide of platinum is precipitated in union with the ammonia. When this compound is expoſed to ſudden heat it crackles, with a rapid agitation. But Fourcroy and Vauquelin obſerved that if it be heated gradually, it fulminates violently; and thus forms a *fulminating platinum*, ſimilar to the fulminating gold formerly deſcribed.

(1726.) Bergman firſt obſerved that if the triple ſalts of platinum, into whoſe compoſition potaſh, or ammonia enters, be expoſed to a red heat, the platinum is reduced to its metallic form; and this is the method commonly employed for obtaining platinum pure. (1708.)

(1727.) The oxide of platinum is alſo known to combine with the *Oxalic*, the *Benzoic*, and the *Pruſſic* acids; but as the properties of theſe ſalts have not been examined, we forbear entering upon them.

Sect. III. Silver.

(1728.) This metal was probably known almoſt as early as gold. It is of a fine white colour, and its luſtre is not inferior to that of any of the metals, if we except, perhaps, poliſhed ſteel. When melted its ſpecific gravity is 10·477; when hammered 10·510.

(1729.) Its malleability is only inferior to that of gold. It may be beaten into leaves only $\frac{1}{160000}$th part of an inch in thickneſs. Its ductility is alſo ſo great that a grain of ſilver may be drawn into a wire 400 feet in length. Its tenacity is alſo great, as a wire of it 0·078 inch diameter will ſupport 187·13 lbs. avoirdupois, without breaking.

(1730.) Silver melts at a red heat, being about 1000° of Fahrenheit, or 21° of Wedgewood. When melted, its brilliancy is much increaſed. With a very violent, and long continued heat, this metal boils, and riſes in vapour. When ſlowly cooled, after the ſurface has congealed, if the liquid part be poured out, it is found to have cryſtallized into four-ſided pyramids, both inſulated and in groups; as was obſerved by Tillet, and Mongez jun. On cooling, its ſurface alſo exhibits a cryſtallized appearance.

(1731.) Silver becomes tarniſhed, but is not oxydized by expoſure to air or water. But if long kept melted in an open veſſel, it gradually combines with oxygen, and is converted into an oxide. Macquer, by expoſing ſilver 20 times ſucceſſively to heat in a porcelain furnace, obtained a glaſſy oxide of an olive green colour. If the heat be ſufficiently great, the ſilver takes fire, and burns like a combuſtible body. Van Marum by expoſing a ſilver wire to his powerful electric machine, cauſed it to burn with a greeniſh white flame, and to evaporate in ſmoke. Before an inflamed ſtream of oxygen and hydrogen gas, it rapidly burns with a light green flame. When ſilver leaf or wire are expoſed to the galvanic battery, they burn with great brilliancy, and are diſſipated in vapour. The oxide of ſilver, that is formed by means of heat, is of a greeniſh or olive colour. But the oxide which is precipitated from ſolution of ſilver in nitric acid, by means of lime water, is of a dark olive brown colour. This oxide contains

89 ſilver,
11 oxygen.
——
100

Scheele aſcertained that this oxide is decompoſed by light, which ſeparates the greateſt part of the oxygen, leaving a black powder, which is the ſilver reduced. The ſun's rays alſo precipitate ſilver from its ſolution in nitric acid, in the form of a dark brown powder. The oxide of ſilver is uſed for colouring glaſs and enamels, and for making figures on porcelain.

(1732.) Silver combines readily with ſulphur, and with phoſphorus, but it does not unite with carbon or with hydrogen.—The *ſulphuret of ſilver* is formed by placing plates of ſilver and ſulphur in alternate layers, in a crucible, and expoſing them to heat. They combine, and melt at a low red heat, and often cryſtallize on cooling in ſmall needles. The ſulphuret is more fuſible than ſilver, and is of a black or deep violet colour. It often occurs native, of a dark grey colour, a metallic luſtre, and having the ſoftneſs, the flexibility and malleability of lead. It may be cut with a knife, and by a ſufficient heat the ſulphur is expelled, and the ſilver left pure. The ſpecific gravity of ſulphuret of ſilver is 7·2, and according to Klaproth it is compoſed of

85 ſilver,
15 ſulphur.
——
100

(1733.) It is well known that when ſilver is long expoſed to the air, eſpecially in places of public reſort; or when it is plunged into tainted eggs, or into ſulphureted hydrogen water, or expoſed to the fumes of ſulphur, its ſurface acquires a dark violet colour. This cannot be detached from the ſilver without bending or breaking it with a hammer. Prouſt aſcertained that this ſuperficial covering conſiſts of *ſulphuret of ſilver*.

(1734.) *Phoſphuret of ſilver* was firſt formed by Mr Pelletier, by mixing one ounce of ſilver, one ounce of phoſphoric glaſs, and two drams of charcoal in a crucible, and applying heat. This compound is of a white colour, granulated, breaks under the hammer, and may be cut with a knife. It is compoſed of four parts of ſilver, and one of phoſphorus. Heat expels the phoſphorus, and leaves the ſilver pure.

(1735.) Silver combines, and forms alloys, with a great number of the metals.—One twentieth part of ſilver adds a ſenſible whiteneſs to gold. The colour is not only paler, but exhibits a greeniſh tinge, as if the light reflected from the ſilver had paſſed through a very thin covering of gold. The alloy of gold with ſilver, is employed as ſolder, to unite pieces of gold, as it is more fuſible than that metal. Silver, like gold, is too ſoft to be made into utenſils or money, and for theſe purpoſes it is commonly alloyed with copper, which does not ſenſibly impair the colour of ſilver, if not in too great proportion. The denſity of this alloy is leſs than the mean denſity of the two metals. In France 137 parts of ſilver are alloyed with 7 of copper. Britiſh ſtandard ſilver, from which our coin is fabricated, contains 11 parts of ſilver, and one of copper.

(1736.) Silver combines with platinum, when they are melted together with exceſſive heat. The alloy is harder, but leſs white and ductile than ſilver. If the alloy be kept ſome time in fuſion, the platinum ſeparates, and ſinks to the bottom, from its weight, leaving the ſilver floating on its ſurface. This ſhews there is not much affinity between theſe metals.—The order of the affinities of ſilver for the other metals, is thus ſtated by Bergman.

Silver.

Lead,
Copper,
Mercury,
Biſmuth,
Tin,
Gold,
Antimony,

Iron,
Manganeze,
Zinc,
Arſenic,
Nickel,
Platinum.

(1737.) Silver is not found ſo univerſally diſtributed through the mineral kingdom as gold; but it is found in much greater quantity, and, like gold, it abounds moſt within the tropics. It occurs chiefly in veins in the neweſt primitive rocks; and is found 1. *native*. In this ſtate it forms the principal part of the richeſt mines of Potoſi, and occurs in various other parts of the world, particularly in the old ſilver mine of Alva, north from Stirling. It is often cryſtallized in various figures; and at Potoſi it often reſembles the branches of trees, particularly of the fir; and is hence called *dendrites*. Native ſilver is often tarniſhed, and generally contains from 3 to 5 per cent. of gold or arſenic. 2. *Auriferous ſilver ore*, when the ſilver is combined with more than 20 *per cent.* of gold, has only been obſerved at Konigſberg in Norway, and at Schlangenberg in Siberia. 3. *Antimonial ſilver ore*, is found in the mines of Spain and Germany. Colour between ſilver and tin-white. Often cryſtallized. 4. *Arſenical ſilver ore*, has only been found at Andreaſberg in the Hartz. Colour tin-white, is often cryſtallized. 5. *Vitreous ſilver ore*, is ſulphuret of ſilver deſcribed (1732.) It is found in the mines of Germany and Hungary, and is ſometimes cryſtallized. 6. *Brittle ſilver ore*, is a compound of antimony, ſilver, and ſulphur, and is found in Saxony and Hungary. Its colour is between iron black and dark lead grey. Is often cryſtallized. 7. *White ſilver ore* occurs at Himmelfurſt in Saxony. It is a compound of ſilver, ſulphur, antimony, and various metals, with ſilica and alumina. 8. *Red ſilver ore*, is very common in Germany, and is ſubdivided into the *dark red*, and the *light red*. It contains a variety of metals, with ſulphur and ſulphuric acid, &c. 9. *Corneous ſilver ore*, or *horn ore*, is found in Saxony, and in South America, ſometimes cryſtallized in cubes. Its colour pearl grey, of various intenſity. It is a compound of ſilver, muriatic and ſulphuric acids, oxide of iron, and alumina. 10. *Carbonate of ſilver*, occurs in the mine of Winceſlas in Suabia. Its colour is greyiſh black, arranged in maſſes, or diſſeminated. 11. *Silver black*, or *ſooty ſilver ore*, accompanies other veins of ſilver ores, and is divided into two varieties. It is ſuppoſed to be a compound of oxide of ſilver, ſulphur, and muriatic acid. 12. Silver is found, in greater or ſmaller proportion, in ores of lead; and thoſe ores of lead which contain a great value of ſilver are wrought for the latter, while the lead is deſtroyed. The proceſs of extracting ſilver from lead, is called *refining the lead*, becauſe after the ſilver is removed, the lead is more malleable and ductile than it was before.

(1738.) Silver does not combine with acids, any more than gold or platinum; but its oxide combines with acids, and forms ſalts, a few of which may be conſidered. The order of the affinities of oxide of ſilver for acids, according to Bergman, is the following:—

Oxide of Silver.

Muriatic acid,
Oxalic,
Sulphuric,
Saclactic,
Phoſphoric,
Sulphurous,
Nitric,
Arſenic,
Fluoric,
Tartaric,
Citric,
Lactic,
Acetic,
Succinic,
Pruſſic,
Carbonic.

I. Sulphate *of* Silver.

(1739.) Sulphuric acid does not act upon ſilver when cold; but when concentrated and boiled upon filings of that metal, the acid is partly decompoſed, and an efferveſcence takes place, owing to the eſcape of ſulphurous acid gas. The ſilver is reduced to a white maſs, which is ſoluble in diluted ſulphuric acid. The ſolution yields, on evaporation, cryſtals of *ſulphate of ſilver*, which are white and brilliant, and have the form of very ſmall priſms. According to Wenzel, this ſalt requires 88¼th parts of water to diſſolve it; and hence the reaſon why *ſulphate of ſilver* is precipitated in white powder, when ſulphuric acid is dropt into ſolutions of ſilver. When heated it melts, and ſtrongly heated is decompoſed. Sulphurous acid, and oxygen gas are diſengaged. It is alſo ſlowly decompoſed by light. It is decompoſed by alkalies and alkaline earths, and their carbonates; by muriates, phoſphates, and fluates. This ſalt contains

17·4 ſulphuric acid
82·6 oxide of ſilver

100

II. Sulphite *of* Silver.

(1740.) The ſulphurous acid only acts on the oxide of ſilver, and forms a ſalt in ſmall brilliant white grains. This ſalt has an acrid metallic taſte, and is only ſoluble, in minute quantity, in water. Hence ſulphurous acid occaſions a white precipitate in ſolutions of ſilver. Light cauſes this ſalt to aſſume a brown colour, and it is decompoſed by heat. A triple compound of *ſulphite of ſilver and ammonia* may be formed.

III. Nitrate *of* Silver.

(1741.) Nitric acid diſſolves about half its weight of ſilver. Part of the acid furniſhes oxygen to the ſilver, converting it into an oxide, while nitrous gas eſcapes with efferveſcence. The oxide is diſſolved in the remainder of the acid. If the acid be contaminated with muriatic acid, a white inſoluble muriate of ſilver falls to the bottom. If the ſilver contain copper, the ſolution acquires a greeniſh tinge; and if it contain gold, that metal is precipitated in the form of a black, or very deep purple powder.

(1742.) The ſolution is limpid and colourleſs, heavy and cauſtic. When diluted with water, a comb dipped into it is often drawn through the hair, with a view to dye it; and it conveys to the hair, to the ſkin, and to almoſt all animal ſubſtances, an indelible black colour. When evaporated to a pellicle, it forms, on cooling, tranſparent, brilliant, and irregular cryſtals; in thin plates, which are ſometimes ſix-ſided, four-ſided, or three-ſided. Their taſte is metallic, and very bitter. At 60° water diſſolves its own weight of this ſalt, and much more when boiling. It does not deliqueſce in the air; but part of the ſilver is reduced by light. Heated it melts, ſwells, and loſes its water, but ſtill remains liquid. On cooling it forms a grey coloured maſs, cryſtallized internally in needles. In this ſtate it is caſt in moulds, and uſed by ſurgeons under the names of *lapis infernalis*, and *lunar cauſtic*, to open ulcers, and deſtroy fungous excreſcences.

(1743.) Mrs Fulhame diſcovered that a ſolution of this ſalt in water, is decompoſed, and the ſilver reduced, by the action of hydrogen gas and phoſphorus. If ſilk or paper be moiſtened with a ſolution of this ſalt, and expoſed to a ſtream of hydrogen gas, it is immediately coated with ſilver, which ſtrongly adheres. Phoſphorus, and the ſulphurous acid gas, produce the ſame effect. Thus this lady diſcovered the art not only of dyeing gold, but ſilver. A ſtick of phoſphorus immerſed in a ſolution of this ſalt, is ſoon coated with ſilver, in the ſame way as was deſcribed reſpecting gold (1703.) and the coating may be ſeparated in the ſame manner.

(1744.) When this ſalt is thrown upon burning coals, it detonates, and the reduced ſilver remains adhering to the ſurface of the coal. When diſtilled the ſalt is alſo decompoſed, and nitrous gas, oxygen gas, and azotic gas are diſengaged, while ſilver remains behind.

(1745.) When mixed with phoſphorus, and ſmartly ſtruck with a hammer, this ſalt detonates violently, whether it be in cryſtals, or after it has been melted. If three grains of ſulphur, and nine grains of this ſalt be mixed, and ſtruck with a cold hammer, the ſulphur inflames; but if they be ſtruck with a hot hammer, the mixture detonates, and the ſilver is reduced. If charcoal be ſubſtituted in place of ſulphur, the detonation is feeble, even when ſtruck wirh a hot hammer. The combination with ammonia, which forms *fulminating ſilver*, was deſcribed when treating of ammonia, (1241.) All the alkalies and alkaline earths decompoſe this ſalt; alſo the ſulphuric, ſulphurous, muriatic, phoſphoric, and fluoric acids, and their ſalts.

(1746.) The ſilver is precipitated from ſolutions of this ſalt, in its metallic ſtate, by the greater number of the metals, and eſpecially by mercury and copper, which at the ſame time combine with it. When the ſilver is precipitated by means of mercury, in many caſes it aſſumes an arboreſcent form, which was long the admiration of the alchymiſts under the name of *arbor Dianæ*.

(1747.) Mr Prouſt has obſerved that the nitrate of ſilver is in reality an *oxy-nitrate* of ſilver, as ſo much of the nitric acid is decompoſed in the formation of this ſalt, as to leave the remainder ſurcharged with oxygen.

IV. MURIATE *of* SILVER.

(1748.) Muriatic acid does not act upon ſilver, even when aſſiſted by heat. But if this acid, or any of its combinations with alkalies or earths, be dropped into the ſolution of ſilver in nitric acid, a white flaky precipitate is produced, which is muriate of ſilver.

(1749.) This is an almoſt inſoluble ſalt, requiring 3072 parts of water to diſolve it. When expoſed to the air, part of the acid eſcapes, and part of the oxide of ſilver is reduced, and the ſalt acquires a purple colour. Expoſed to heat it melts, and on cooling, becomes a grey-*coloured* tranſparent maſs, reſembling horn, and hence it obtained the name of *luna cornea*, or *horn ſilver*. A ſtrong heat raiſes it in vapour; and it paſſes through an earthen crucible unleſs it be lined with alkali, in which caſe the ſalt is decompoſed, and the ſilver obtained pure. This ſalt is decompoſed by the alkaline carbonates, but not by the pure alkalies. It is not decompoſed by any of the acids, becauſe the muriatic has a ſtronger affinity for ſilver than any other acid. When found native, copper, iron, lead, tin, zinc, and other metals, are fuſed along with it, which ſeparates the ſilver in its metallic form, tho' it is always alloyed with a portion of the metal employed. Muriate of ſilver is ſoluble in ammonia, and if a portion of liquid mercury be mixed with the ſolution, the ſilver ſlowly combines with the mercury, and forms the ramified cryſtallization mentioned (1746.) under the name of *arbor Dianæ*. Margraf recommends this amalgamation as the beſt method of procuring pure ſilver.

(1750.) As it is by muriate of ſilver that the different muriates are analyſed, conſiderable pains have been taken to aſcertain the conſtituents of this ſalt. The following is the reſult of the experiments of

	Kirwan,	*Chenevix,*	*Zaboada,*	*Prouſt.*
Muriatic acid	16·54	17	17·7	18
Oxide of ſilver	83·46	83	82·3	82
	100	100	100	100

V. HYPEROXYMURIATE *of* SILVER.

(1751.) This ſalt was firſt diſcovered by Mr Chenevix. It may be formed by boiling phoſphate of ſilver in hyper-oxymuriate of alumina, or by paſſing a current of oxymuriatic acid gas through water in which oxide of ſilver is ſuſpended. In this caſe two ſalts are formed, namely the muriate of ſilver laſt deſcribed, which is inſoluble, and the hyperoxymuriate of ſilver, which is ſoluble in two parts of warm water. As the ſolution cools, it depoſits the ſalt in ſmall rhomboidal cryſtals, which are opaque and dull. It is alſo ſoluble in alcohol. The muriatic, nitric, and even the acetic acids decompoſe the hyperoxymuriatic acid in this ſalt, and muriate of ſilver remains behind. Its acid is alſo decompoſed by a moderate heat, which expels its exceſs of oxygen.

(1752.) If this ſalt be mixed with half its weight of ſulphur, and ſlightly ſtruck, it emits a white and vivid flaſh, and fulminates with terrible violence. The ſilver is reduced and volatilized. The action of other combuſtibles upon this ſalt, has been tried.

VI. FLUATE *of* SILVER.
VII. BORATE *of* SILVER.
VIII. PHOSPHATE *of* SILVER.

(1753.) Theſe ſalts are formed by ſaturating their acids with oxide of ſilver; but as they have not been applied to any uſe, we forbear entering into a deſcription of them.

IX. CARBONATE *of* SILVER.

(1754.) Occurs native, as already ſtated; and may be formed by paſſing the carbonic acid gas through the oxide of ſilver, agitated in water. Upon ſilver itſelf the carbonic acid has no action whatever. Carbonate of ſilver may alſo be formed by precipitating oxide of ſilver from any of its acid ſolutions, by means of the carbonated alkali. This ſalt is a white inſoluble powder, which becomes black by expoſure to light. It is decompoſed by heat, and the ſilver is reduced to its metallic ſtate. Its conſtituents are

14·2	carbonic acid
85·8	oxide of ſilver
100	

(1755.) The oxide of ſilver combines with all the other acids; but as the ſalts thus formed have not been particularly examined, and none of them are applied to any uſe, we do not eſteem it neceſſary to enter into a deſcription of them.

(1756.) Silver forms no combination with the earths; but its oxide combines with ſome of them by vitrification, and is uſed in the arts to convey to glaſs and enamels a yellow, olive green, or browniſh colour.

SECT. IV. MERCURY.

(1757.) At what time mercury was firſt diſcovered is unknown; but the ancients employed it, as it is employed by the moderns, to ſeparate gold and ſilver from their ores. Reſembling ſilver in colour, it obtained the names of *hydrangyrum, argentum vivum, quickſilver*; by which names it has been known in all ages. It differs from all other metals in being fluid at the uſual temperature of the atmoſphere. Its brilliancy is conſiderable, and when not tarniſhed its ſurface makes a good mirror. It has neither taſte nor ſmell.—Its ſpecific gravity is 13·568.

(1758.) Mercury is found 1. Native, in ſmall globules interſperſed through its ores. 2. Amalgamated with ſilver. 3. Combined with muriatic acid. 4. Combined with ſulphur; of which one ſpecies is of a red colour, and is called *native cinnabar*. There are ſeveral varieties of the ſulphurets of mercury, and it is from them that the greateſt part of the mercury of commerce is extracted. Mercury has never been found in Britain, nor in any workable quantity in France. But it is found in Germany and Hungary, and in various other countries, and the moſt productive mines are thoſe of Idria; thoſe near Cordova in Spain, which were wrought by the Romans; thoſe of the Palatinate; and thoſe of Guanca Velica in Peru.

(1759.) That mercury may be made to congeal, was firſt obſerved by the Peterſburgh academicians in 1759, while they were plunging a thermometer into a mixture of ſnow and ſalt, during an intenſe froſt. Obſerving the mercury ſtationary, they broke the bulb, and found it congealed into a ſolid maſs. But as mercury ſhrinks rapidly at the inſtant of its congelation, theſe philoſophers were led to fix its freezing point much lower in the ſcale than it really is. The experiment has often been repeated in Britain; and Mr Macnab aſcertained its freezing point at Hudſon's Bay, to be 39° below 0 of Farenheit.—Solid mercury extends under the hammer, and is therefore malleable; but neither its degree of malleability, nor ductility have been aſcertained.

(1760.) This metal boils at 656°, and may be diſtilled from one veſſel into another, which is the uſual way of ſeparating it from impurities. A retort of iron is commonly uſed for this purpoſe, and it is condenſed in a receiver of glaſs. Its vapour is inviſible and elaſtic like common air, and its elaſticity is indefinitely increaſed by heat. Geoffroy having encloſed a quantity of mercury in an iron globe, ſtrongly defended by iron hoops; as ſoon as it became red hot in a furnace, it burſt with all the fury of a bomb, and the mercury was diſſipated.

(1761.) Water has no action on mercury; but if it be long expoſed to the air, eſpecially if it be heated and agitated in a bottle with admiſſion of air, it combines with the oxygen of the atmoſphere, and is encruſted with a black powder. This was formerly called *ethiops per ſe*, and is the firſt oxide, or *protoxide* of the metal, which, according to Fourcroy contains

Mercury	96
Oxygen	4
	100

This oxide may alſo be obtained by agitating mercury in oxygen gas, or by triturating it with water. A ſtrong heat expels the oxygen from it, and the mercury returns to its metallic ſtate.

(1762.) If the black oxide of mercury be expoſed to a moderate heat; or if pure mercury be put into a flat-bottomed glaſs matraſs, whoſe neck is drawn into a long narrow tube, to admit air, but prevent the eſcape of the mercurial vapour, and if the matraſs be kept long in a ſand-bath at the boiling temperature of mercury, it combines with an additional doſe of oxygen, and an oxide is formed of a red colour. This oxide was formerly called *precipitate per ſe*.—A ſimilar oxide, of a deep ſcarlet colour, may be obtained by diſſolving mercury to ſaturation in nitric acid; evaporating to dryneſs, and expoſing the powder which remains to a gradual heat.—This red oxide poſſeſſes a diſagreeable taſte, and is very poiſonous. It is ſomewhat ſoluble in water. When rubbed with mercury it imparts a portion of oxygen, and the mixture aſſumes various colours according to the proportion of the ingredients. When heated with the filings of zinc or tin, it ſets theſe metals on fire. Its conſtituents are, according to

Fourcroy,

	Fourcroy,	Chenevix,
Mercury	92	85
Oxygen	8	15
	100	100

(1763.) Of the ſimple combuſtibles, mercury only combines with ſulphur and phoſphorus.—Two parts of ſulphur and one of mercury being rubbed together in a mortar, they incorporate, and form a black powder, which was formerly called *ethiops mineral*. Or if mercury be dropped ſlowly into its own weight of melted ſulphur, and the mixture conſtantly ſtirred, a ſimilar black compound is formed. It is hardly poſſible to mix the ingredients ſo effectually, but ſmall globules of mercury may be ſeen in it, by a microſcope. If the *black ſulphuret of mercury*, prepared as above, be heated ſo as to expel part of the ſulphur, it aſſumes a deep violet colour.

(1764.) If the black ſulphuret be heated red hot, it ſublimes, and forms a cake of a beautiful red colour. The cake was formerly called *cinnabar*, and when reduced to fine powder, is known in commerce under the name of *vermilion*, which is uſed as a paint. This *red ſulphuret of mercury*, according to Prouſt, conſiſts of

Mercury	85
Sulphur	15
	100

The ſpecific gravity of the red ſulphuret is about 10. It is inſoluble in water, and in muriatic acid, taſteleſs, and is not altered by the air. Heated it burns with a blue flame. Mixed with half its weight of iron filings, and diſtilled in an earthen retort, the ſulphur combines with the iron, and the mercury comes over into the receiver which ought to contain water.

(1765.) Mr Kirchoff, has lately propoſed another method of preparing the red ſulphuret of mercury. A mixture of 300 grains of mercury, 68 of ſulphur, and a few drops of ſolution of potaſh, are rubbed ſometime in a porcelain cup by a glaſs peſtle, until the black ſulphuret is formed. To this are added 160 grains of potaſh diſſolved in as much water. The ingredients are now heated over the flame of a candle, triturated inceſſantly, and clear water added to compenſate what had evaporated, and ſo as to cover the ſolid ſulphuret to the depth of about an inch. On continuing the heat and trituration about two hours, the black colour firſt changes to a brown, and then changes rapidly to a red. No more water muſt now be added, but the trituration muſt be continued without interruption. When the mixture is evaporated to the conſiſtence of a gelly, the red colour increaſes in brightneſs with inconceivable rapidity. The inſtant it has acquired its utmoſt brightneſs, it muſt be removed from the heat, or it will paſs into a dirty brown. To prevent the brown colour from commencing, Count de Mouſſin Pouſcphin removes it as ſoon as it has acquired the red colour, and expoſing it for two or three days to a gentle heat, adding a few drops of water, and agitating the mixture from time to time, he enſures the gradual improvement of the red colour, and ſtops the proceſs as ſoon as it has attained its utmoſt brightneſs.

(1766.) Phoſphorus does not unite with mercury; but it forms a phoſphuret with the black oxide of mercury. This compound is formed by melting the phoſphorus with mercury in a retort filled with hydrogen gas, to prevent the combuſtion of the phoſphorus. The compound is of a black colour, ſolid, and cuts with a knife. It exhales vapours of phoſphorus in the air.

(1767.) Mercury combines with a great number of the metals, and theſe compounds are called *amalgams*.—With gold, mercury combines readily and in any proportion. The eaſieſt way to form this amalgam is to heat mercury until it begins to ſmoke, and then throw into it ſmall pieces of red hot gold.—This amalgam is of the whiteneſs of ſilver; and by ſqueezing it through a piece of leather, part of the mercury ſeparates, and there remains an amalgam conſiſting of one part of mercury to about two of gold, which gradually becomes ſolid. This melts at a low heat, and at a heat approaching to redneſs, the mercury evaporates, and the gold is left in a ſtate of purity.—Hence this amalgam is much uſed in gilding; for being equally ſpread upon the ſurface of a piece of metal, and a gentle heat equally applied, the mercury is evaporated, while the gold adheres to the ſurface of the metal. It is then rubbed under water with a bruſh, compoſed of braſs wire, and is afterwards burniſhed.

(1768.) When platinum, precipitated from its acid ſolution by means of ſal ammoniac, is triturated with mercury, adding ſmall portions of each metal alternately, and applying a gradual heat, the platinum forms an amalgam with the mercury. The exceſs of mercury being now ſqueezed through leather, there remains an amalgam of a brilliant whiteneſs, which does not tarniſh. It gradually becomes hard, and anſwers much better than the amalgam of tin for covering the ſurface of glaſs, ſo as to convert it into a mirror.

(1769.) The amalgam of ſilver is made in the ſame way as that of gold. Its ſpecific gravity is greater than the mean of the two metals. It is white; but as it always continues ſoft, it does not anſwer for mirrors. But it is employed, exactly in the ſame way as the amalgam of gold (1767.) for coating the ſurface of the inferior metals with ſilver.

(1770.) The order of the affinities of mercury for the other metals, is the following.

MERCURY.

Gold,
Silver,
Tin,
Lead,
Biſmuth,
Platinum,
Zinc,
Copper,
Antimony,
Arſenic,
Iron.

(1771.) Mercury does not combine with the acids, unleſs it be previouſly oxidized; but its oxide forms ſalts with the acids, in the following order of affinity.

Oxide of Mercury.

Muriatic acid,
Oxalic,
Succinic,
Arſenic,
Phoſphoric,
Sulphuric,
Saclactic,
Tartaric,
Citric,
Sulphurous,
Nitric,
Fluoric,
Acetic,
Boracic,
Pruſſic,
Carbonic.

I. Sulphate *of* Mercury.

(1772.) There are ſeveral varieties of this ſalt, but they may be reduced to two general claſſes, the *ſulphate* and *oxyſulphate*.

(1773.) The *ſulphate of mercury* is prepared by heating ſulphuric acid upon mercury in a retort (721). Sulphurous acid gas eſcapes with efferveſcence; the mercury is oxidized, and converted into a white maſs, the nature of which varies according to the proportion of the ingredients, and the degree of heat employed. But if the ſulphuric acid be diluted with its own weight of water, and boiled upon mercury, very little ſulphurous acid gas eſcapes, and *ſulphate of mercury* is formed, which by proper evaporation may be obtained in ſmall priſmatic cryſtals. This ſalt is not altered by the air, but is decompoſed by heat. It is ſoluble in 500 parts of cold water, and in 287 parts of boiling water. It is compoſed, according to Fourcroy, of

Sulphuric acid,	12
Oxide of mercury,	83
Water,	5
	100

(1774.) The *oxyſulphate of mercury* is formed by boiling three parts of ſulphuric acid, upon two parts of mercury. Sulphurous acid is diſengaged, and the mercury combines with an additional doſe of oxygen. This ſalt cryſtallizes in ſmall priſms, and always contains an exceſs of acid. When dry, it is of a fine white colour. It is compoſed of

Oxyſulphuric acid	31·8
Peroxide of mercury	63·8
Water	4·4
	100

(1775.) When water is poured upon this ſalt, the part which contains exceſs of acid is diſſolved, and may be waſhed off. There remains a beautiful yellow and nearly inſoluble powder, which is the ſame ſalt with exceſs of baſe. Its ſpecific gravity is 6·444. It is only ſoluble in 2000 parts of cold, and in 600 parts of boiling water. This was formerly extolled for its medicinal virtues, under the name of *turpeth mineral*.—It is compoſed of

Oxyſulphuric acid,	15·0
Peroxide of mercury,	84·7
Water,	0·3
	100

(1776.) A triple ſalt, or *ſulphate of mercury and ammonia*, may be formed by adding ammonia to a ſolution of neutral ſulphate of mercury.

II. Nitrate *of* Mercury.

(1777.) This ſalt, like the former, exiſts in two ſtates, namely a *nitrate* and *oxynitrate*. The *nitrate of mercury* is formed by pouring nitric acid upon mercury. Part of the acid is decompoſed; nitrous gas eſcapes with efferveſcence; an oxide is formed, which is diſſolved in that part of the acid which remains undecompoſed. Without the aſſiſtance of heat, nitric acid diſſolves nearly its own weight of mercury. The ſolution is colourleſs, heavy, and very cauſtic. It tinges the ſkin, and almoſt all animal ſubſtances, of an indelible black colour. By ſpontaneous evaporation, it yields tranſparent cryſtals, of two four-ſided pyramids applied baſe to baſe, having their apexes and angles at their baſes truncated. The cryſtals of this ſalt are ſoluble in water without decompoſition.

(1778.) Sulphureted hydrogen gas, being paſſed through a ſolution of this ſalt, ſeparates the metal in union with ſulphur. Muriate of tin alſo precipitates the mercury in its metallic form.

(1779.) This ſalt detonates feebly, when thrown upon burning coals. But when mixed with a portion of phoſphorus, and ſtruck with a hot hammer, it fulminates violently, and the mercury recovers its metallic form.—Mr Howard, by diſſolving 500 grains of mercury, in an ounce and a half by meaſure of nitric acid, with the aſſiſtance of heat; and pouring the ſolution, when cold, upon two meaſured ounces of alcohol, and afterwards applying a moderate heat, obtained a powdery precipitate. This precipitate being thrown upon a filter, well waſhed with diſtilled water, and afterwards dried by the heat of a water bath, explodes violently when ſtruck by a hammer on an anvil, and ſo as to indent both the hammer and the anvil. It alſo explodes when heated to 368° of Fahrenheit, and by the diſcharge of an electric battery. It is dangerous to explode more than a grain, if a perſon is near it; but this, like all the other fulminating compoſitions, if put into a gun, in ſufficient quantity to impel a ball with the force of a charge of powder, always burſts the piece. This we muſt aſcribe to the inſtantaneous extrication of the gaſes from theſe ingredients; while gunpowder burns, and emits its gaſes more ſlowly.

(1780.) *Oxynitrate of mercury* is formed when the nitric acid is made to act upon mercury with the aſſiſtance of heat. In this caſe a greater proportion of the acid is decompoſed, and the mercury is more completely oxidized. A continuance of the heat makes it paſs into a yellow cryſtalline maſs. If cold water be poured on this maſs, it depoſits a white precipitate; but hot water produces a yellow, or greeniſh yellow precipitate. This ſalt contains an exceſs of acid, as it changes blue colours to red. According to Braamcamp and Siquera-Oliva, it contains

12	nitric acid,
88	peroxide of mercury.
100	

(1781.) Sulphureted hydrogen gas precipitates from this ſalt nitrate of mercury in union with ſulphur, in the form of a white powder. Muriate of tin precipitates the mercury in the ſtate of a protoxide, which combines with the muriatic acid previouſly in union with the tin. From this mixed precipitate muriate of mercury may be obtained by ſublimation.

III. Muriates *of* Mercury.

(1782.) None of the metals attracted ſo much of the attention of the alchemiſts as mercury, and few of the ſalts have been more the objects of inveſtigation either among them, or among philoſophers, after chemiſtry began to rank as a ſcience, than *muriate of mercury*. The muriatic acid has no action whatever upon mercury; but it combines readily with the oxides of this metal. As muriatic acid was ſhewn to exiſt in three ſeparate ſtates (from 759 to 797), either charged with a maximum of oxygen, or with a lower proportion, or in its uſual ſtate when it obtains the name of muriatic acid, it may be proper to conſider the ſalts it forms with mercury in this order.

Hyperoxymuriate *of* Mercury.

(1783.) This ſalt was formed by Mr Chenevix, by paſſing oxymuriatic acid gas through a mixture of water and red oxide of mercury. In this caſe two ſalts are formed, one the *muriate*, and the other the *hyperoxymuriate* of mercury, as was explained (792). The latter ſalt is ſoluble in about four parts of water, and may be obtained pure by repeated cryſtallization. The ſulphuric, and even weaker acids decompoſe it, by expelling its hyperoxymuriatic acid.

Oxymuriate *of* Mercury.

(1784.) This ſalt is uſually known by the names of *corroſive ſublimate*, and *corroſive muriate of mercury*. Many proceſſes have been employed for its preparation, but the one moſt commonly adopted is as follows. Equal parts of dry oxynitrate of mercury (1780), of decrepitated common ſalt, and of calcined ſulphate of iron, are mixed and put into a matraſs ſo as to occupy one third of its depth. The matraſs being placed in a ſand-bath, is gradually heated to redneſs. The ſulphuric acid leaves the ſulphate and expels the muriatic acid from the common ſalt, which combining with the oxynitrate of mercury, ſublimes in union with its baſe. After the apparatus cools, oxymuriate of mercury is found in the upper part of the matraſs. —For chemical purpoſes this ſalt is commonly prepared by diſſolving the red oxide of mercury in muriatic acid. The ſalt cryſtallizes ſpontaneouſly.

(1785.) When obtained by ſublimation, this ſalt is in the form of a white ſemi-tranſparent maſs, conſiſting of ſmall needles. It is ſoluble in 20 parts of cold water. Water boiled upon this ſalt diſſolves about $\frac{1}{3}$d of its weight of it. Cold alcohol diſſolves $\frac{3}{8}$ths of its weight; and boiling alcohol 88 parts in 100 of its weight. Its aqueous ſolution yields, by evaporation, cubes, or rhomboidal priſms; or quadrangular priſms with their ſides alternately narrower, and terminated by dihedral ſummits. Its taſte is exceſſively acrid and cauſtic. Its ſpecific gravity is 5·1398. When ſwallowed, this is one of the moſt violent poiſons known, as it ſoon corrodes the ſtomach and inteſtines. When it is ſublimed it is alſo very dangerous to inhale any of its vapours.—A ſolution of this ſalt is an uſeful teſt to diſcover the preſence of fixed alkalies in liquors. If dropped into ſuch liquors, a yellow precipitate firſt enſues, which ſoon changes to a brick red.

(1786.) This ſalt is decompoſed, not only by the fixed alkalies, but by the alkaline earths. With ammonia it forms a triple ſalt. It is alſo decompoſed by all the metallic ſulphurets, and by ſeveral of the metals; with the ſulphurets forming a precipitate conſiſting of mercury combined with ſulphur; with the metals, aided by heat, the precipitate is mercury in its metallic ſtate.

(1787.) With regard to the proportion of oxygen which enters into the compoſition of the oxide of this ſalt, authors vary. Mr Chenevix thinks it about 17·6, and Zaboada about 10 *per cent.*—The following are the conſtituents of this ſalt, according to

	Chenevix,	*Oliva,*	*Zaboada,*
Muriatic acid	18	18·8	19·5
Peroxide of mercury	82	81·2	80·5
	100	100	100

Muriate *of* Mercury.

(1788.) Exiſts native (1758), and ſeems to have been the firſt muriate of mercury that was diſcovered. It paſſes under various names, ſuch as *calomel*, which is its moſt common name; *mercurius dulcis*, or ſweet mercury; *draco mitigatus*, or the dragon tamed. It has alſo been called the *white eagle*, the *tamed eagle*; and many other names too numerous and whimſical to be enumerated.

(1789.) Many methods have been adopted for forming the muriate of mercury; but the proceſs uſually followed is to rub four parts of oxymuriate of mercury, with three parts of liquid mercury, in a glaſs mortar, until no globules of the metal are ſeen, or as the apothecaries expreſs it, until the mercury is *killed*. During this proceſs, the oxymuriatic acid imparts its exceſs of oxygen to the liquid mercury, and converts it into an oxide in union with common muriatic acid. The compound is now ſublimed in a matraſs by the heat of a ſand-bath, but ſtill contains a portion of oxymuriate, which muſt be ſeparated by repeated triturations with mercury, and ſublimations; or by effectual waſhing of the ſalt with water. Scheele and Chenevix pointed out methods of obtaining this ſalt in the liquid way, which it does not ſeem neceſſary to detail.

(1790.) Muriate of mercury is ſcarcely ſoluble in water. It is of a dull white colour, and when ſlowly ſublimed, cryſtallizes in four-ſided priſms, terminated by pyramids. Its ſpecific gravity is 7·1758. It is not poiſonous, like the oxymuriate of mercury; and when taken internally operates as a gentle purgative. When rubbed it phoſphoreſces [illegible] in the dark. The oxymuriatic and the nitric acids diſſolve and convert it into oxymuriate. The conſtituent parts of this ſalt are, according to

	Chenevix.	*Zaboada.*
Muriatic acid,	11·5	10·6
Protoxide of mercury,	88·5	89·4
	100	100

IV. ACETATE OF MERCURY.

(1791.) Is formed by diſſolving in acetic acid the oxide of mercury precipitated from ſolution in nitric acid by means of alkalies. By evaporation and cooling, the acetate of mercury is obtained in thin brilliant flakes. It may alſo be obtained by mixing together ſolutions of acetate of potaſh and nitrate of mercury. The acetate of mercury, thus formed by double affinity, is in large flat cryſtals, of an acrid taſte, and ſcarcely ſoluble in water. It is employed in medicine, and forms the principal ingredient in *Keyſer's pills*.

(1792.) The oxides of mercury combine with all the other acids, forming *mercurial ſalts*, which have either not been much examined, or have not been applied to any uſe. It is therefore deemed unneceſſary to enter into a detail of them. The oxides of this metal, and moſt of its ſalts, are very deſtructive to inſects, and vermin of every kind. They are alſo celebrated for their efficacy in curing a certain diſeaſe, which ſome aſcribe to the change they produce upon the ſyſtem by the eaſe with which they impart oxygen to the parts affected. They ſhould however be adminiſtered with caution, becauſe moſt of them are poiſonous.

SECT. V. PALLADIUM.

(1793.) This metal was diſcovered by Dr Wollaſton in crude platina, in 1803, who gave it the name of *palladium*, or *new ſilver*. Mr Chenevix affirmed it to be an amalgam of platinum and mercury; and whether it be a diſtinct metal, or only an alloy of platinum with ſome other metal, has been a ſubject of much diſpute among chemiſts.

(1794.) Dr Wollaſton obtained palladium from crude platina by the following proceſs:—Mercury was expelled from the platina by a red heat, and gold was ſeparated by digeſting it in a ſmall quantity of diluted nitro-muriatic acid. It was then diſſolved in nitro-muriatic acid, aſſiſted by heat, until the acid was ſaturated, and the whole was diſſolved, excepting a black powder, from which the ſolution was ſeparated. The platinum was now precipitated by a hot ſolution of ſal ammoniac, in the form of a yellow powder. Into the ſolution thus nearly freed from platinum, a piece of clear zinc was immerſed, which threw down a black powder. This being waſhed, was treated with very dilute nitric acid, in a gentle heat, to diſſolve ſome copper and lead in its compoſition. The powder being again waſhed, was digeſted in dilute nitro-muriatic acid until the greater part of it was diſſolved. To this ſolution ſome common ſalt was added, and the whole gently evaporated to dryneſs. The reſidue was waſhed with ſmall quantities of alcohol, until it came off colourleſs. Thus two oxides are waſhed off in union with common ſalt, namely that of platinum, and that of palladium. The firſt being precipitated by ſal-ammoniac, the ſolution was now diluted, and *pruſſiate of potaſh* (1050) mixed with it. This produced a deep orange precipitate; which, when heated, aſſumed a grey colour, and metallic appearance. This is palladium. With ſulphur, or borax, it forms a metallic button, which may be hammered or rolled.

(1795.) Palladium is a white metal, very much reſembling platinum. It is harder than wrought iron, and its ſpecific gravity varies from 11·3 to 11·8. It is equally malleable as platinum, is not altered by expoſure to the air, and melts with a violent heat.

(1796.) The ſulphuric, nitric, and muriatic acids, when boiled upon palladium, diſſolve a portion of it, and the ſolutions are of a fine red colour. The nitro-muriatic acid diſſolves it moſt readily, and forms a beautiful red ſolution. Potaſh and lime-water precipitate the oxide of palladium from theſe ſolutions, of a fine orange colour, being mixed with a portion of the acids, and of the precipitating matters. Sulphur combines readily with palladium when it is ſtrongly heated. The ſulphuret is paler than the metal, and very brittle. A continued heat expels the ſulphur, and the metal remains in a ſtate of purity.

(1797.) Mr Chenevix formed alloys of palladium with gold, platinum, ſilver, copper, lead, tin, biſmuth, and iron. But as this metal is not likely to be found in ſufficient quantity to render it uſeful, we forbear entering into the conſideration of its alloys.

(1798.) To Dr Wollaſton and Mr Chenevix we are chiefly indebted for all the facts that are known reſpecting the combination of palladium with acids. Almoſt all the ſalts it forms are ſoluble in water, and the ſolutions are of a beautiful red colour. Mercury, and ſulphate of iron, precipitate the palladium in its metallic ſtate. Muriate of tin throws down a brown precipitate; but from a diluted ſolution it throws down a fine emerald green precipitate. Pruſſiate of potaſh occaſions a dirty yellowiſh brown precipitate. The ſalts of palladium form triple compounds with potaſh and ſoda. The *muriate of palladium and potaſh* cryſtallizes in four-ſided priſms, which, when viewed in the direction of the axis, are of a bright red colour; but when viewed tranſverſely, are of a bright green. When viewed obliquely they are of a dull brown, owing to a mixture of red and green. But we forbear entering into the particular conſideration of theſe ſalts, for the reaſons above aſſigned.

SECT. VI. RHODIUM.

(1799.) This metal was diſcovered in crude platina more recently than the one laſt deſcribed. —It is extracted by the ſame proceſs which was followed reſpecting the palladium. The dried reſiduum after adding common ſalt, being repeatedly waſhed with alcohol, there remains a ſubſtance of a deep red colour, which is oxide of rhodium united with common ſalt. This compound diſſolves in water, and by ſlow evaporation depoſits cryſtals of a rhomboidal form, and of a deep red colour. If a plate of zinc be immerſed in the ſolution, a black powder precipitates, which being ſtrongly heated with borax aſſumes a white colour, and a metallic luſtre. This is rhodium. Dr Wollaſton found that crude platina contained about one part in 250 of rhodium.

(1800.) Rhodium is of a white colour. It is not fuſible in any heat that can be applied; but as it forms malleable alloys with other metals, we may preſume it would be malleable could it be fuſed into a button. Its ſpecific gravity ſomewhat exceeds 11·0. Potaſh throws it down in the ſtate of a yellow coloured oxide from its combination with common ſalt.

(1801.) It fuſes and unites readily with ſulphur, and with arſenic, forming a brittle compound. It forms alloys with all the metals that have been tried, excepting mercury. It reſembles platinum in deſtroying the colour of a large quantity of gold. Its oxide diſſolves in the muriatic and nitric acids, forming roſe coloured ſolutions, which do not cryſtallize. The rhodium is precipitated from theſe ſolutions, in its metallic ſtate, by copper and other metals. Pruſſiate of potaſh occaſions no precipitate in the ſolutions of the ſalts of rhodium, and thus it is diſtinguiſhed from palladium.

SECT. VII. IRIDIUM.

(1802.) This metal was diſcovered in the black powder left after diſſolving crude platina in diluted nitro-muriatic acid, with a moderate heat, by Mr Smithſon Tennant in 1803. It was alſo diſcovered about the ſame time by Deſcotils, in the *Annales de Chemie*. This black powder, in ſmall ſhining ſcales, had formerly been miſtaken for black lead. But Mr Tennant found its ſpecific gravity to be 10·7, and that it conſiſted of two unknown metals, to the one of which he aſſigned the name *iridium*, from the various colours exhibited by its ſolutions; the other he called *oſmium* from the peculiar ſmell of its oxides.

(1803.) To ſeparate theſe metals, the black powder is mixed with its own weight of potaſh, and kept in a red heat for ſome time, in a ſilver crucible. The potaſh is now diſſolved, and waſhed off by water, by which a deep orange ſolution is obtained. The powder which remains is digeſted in muriatic acid; which firſt becomes blue, then olive green, and laſtly of a deep red colour. The remaining powder muſt be treated alternately with potaſh and muriatic acid, until the whole be diſſolved. The orange coloured ſolution conſiſts of the oxide of oſmium united to potaſh, and the deep red ſolution conſiſts of the oxide of *iridium* united to muriatic acid.

(1804.) This laſt being evaporated to dryneſs, the reſidue again diſſolved in water, and evaporated, yields octahedral cryſtals of muriate of iridium of a red colour. The metal may be obtained by expoſing theſe cryſtals to a ſtrong heat. Or being diſſolved in water, to which they give a deep red colour, the iridium may be precipitated in the ſtate of a black powder, by putting into the ſolution a plate of zinc, or any other metal except gold and platinum. Heat renders this powder white, and it aſſumes the metallic luſtre. It is then pure iridium.

(1805.) This metal reſiſts fuſion by heat as much as platinum. But it forms malleable alloys with all the metals tried, and hence may be eſteemed malleable were it poſſible to fuſe it. It forms a very malleable alloy with copper and ſilver. A conſiderable proportion of it does not injure the colour, nor diminiſh the malleability of gold. It does not unite with ſulphur, or with any of the ſimple combuſtibles. The muriate is the only ſalt of iridium that has been examined, and its properties have been ſtated above. None of the acids act upon the metal, and only the muriatic acid has been tried upon its oxide.

SECT. VIII. OSMIUM.

(1806.) This metal was obtained from the alkaline orange-coloured ſolution, mentioned in the preceding ſection, by Mr Tennant. This ſolution conſiſts of the oxide of oſmium united to potaſh, and its ſmell reſembling that of oxymuriatic acid, induced Mr Tennant to give this metal the name of *oſmium*.

(1807.) To ſeparate the oxide from the alkaline ſolution, the latter is mixed with ſulphuric acid, and diſtilled with a moderate heat. A clear liquid comes over, conſiſting of the oxide diſſolved in water. This liquor has a ſtrong ſmell, and a ſweetiſh taſte. It does not change vegetable blues. The ſame oxide may be obtained in a more concentered ſtate, by diſtilling the black powder of platina mixed with nitre, with a heat approaching to redneſs. There riſes an oily fluid which on cooling conſolidates into a ſemi-tranſparent maſs ſoluble in water.

(1808.) If mercury be agitated in either of theſe ſolutions, the oſmium is reduced to its metallic ſtate, and forms an amalgam with the mercury. After the mercury is diſtilled from this amalgam, the oſmium remains in a ſtate of purity.

(1809.) Oſmium thus obtained is of a dark grey or blue colour. When heated in open veſſels, it ſpeedily oxidizes, and evaporates with its uſual ſmell. But when heated in cloſe veſſels, where its oxidizement is prevented, it is very fixed. It is alſo very refractory, and does not melt with the ſtrongeſt heat. It is not acted upon by any of the acids; but it readily unites with potaſh when aſſiſted by heat, and forms with it an orange yellow ſolution. Theſe circumſtances, together with the great volatility and peculiar ſmell of its oxide, diſtinguiſhed oſmium from all other metals. Its ſolution ſtains the ſkin of an indelible dark colour. The infuſion of galls produces a purple colour in its ſolution, which ſoon changes to a deep and vivid blue. All the metals, except gold and platinum take oxygen from its oxide, and reduce the oſmium. With gold and copper this metal forms malleable alloys.

(1810.) The ſalts of oſmium are unknown, as its oxide does not ſeem to unite with acids, but rather forms compounds with alkalies and earths, by which it exhibits indications of being itſelf an acid.

SECT. IX. COPPER.

(1811.) The name of this metal is derived from the iſland of Cyprus, where it was wrought to a great extent in ancient times. Next to gold and ſilver, it ſeems to have been among the earlieſt metals that were diſcovered. Before the art of working iron was underſtood, the ancients made all their military weapons, and utenſils of bronze, an alloy of copper and tin. This ſeems not to have been diſcontinued until a late period, for a Roman ſword, made of ſome compoſition of this ſort was lately found in a moſs in the remoteſt of the Shetland iſles, ſuppoſed to have been dropped there by ſome of Agricola's ſoldiers, when they circumnavigated the Britiſh iſlands.

(1812.) Copper abounds very much in nature, and it occurs chiefly in veins, though it is ſometimes ſtratified, in the oldeſt of the ſecondary rocks. In Scotland the moſt favourable indications of copper occur in coarſe pudding ſtone, in red ſand ſtone, and in thoſe ſtrata whoſe formation ſeems to have been intermediate between that of the primary mountains and the ſtrata which contain coal.—Copper occurs, 1. Native, when it is ſometimes cryſtallized, ſometimes dendritical, ſometimes botroidal. In this laſt ſtate it occurs in the copper mine of Aithray near Stirling. 2. Combined with ſulphur, or in the ſtate of a ſulphuret, of which there are about ſeven varieties, diſtinguiſhed by different names. Of theſe the ſpecies uſually called *copper pyrites* is the moſt common, and moſt abundant of all the ores of copper. 3. It occurs in the ſtate of an oxide, of which there are ſeveral varieties. 4. Combined with carbonic acid, called *mountain blue*, and ſometimes combined with this acid and iron, of each of which there are ſeveral varieties. 5. Combined with arſenic, or arſeniate of copper. 6. It is ſometimes found combined with the muriatic, the phoſphoric, or the ſulphuric acids. This laſt ſpecies abounds at Perry's mine in Wales, where the water, which flows from the mine, holding ſulphate of copper in ſolution, is collected in reſervoirs, and the copper is precipitated in its metallic ſtate by plates of iron immerſed in the liquor.

(1813.) Pure copper poſſeſſes conſiderable luſtre, and is of a fine red colour. Its taſte is ſtyptic and nauſeous, and when rubbed on the ſkin it leaves a diſagreeable ſmell. Its ſpecific gravity varies according to its purity, and the degree of hammering it has undergone, from 8·830 to 8·895. Japan copper, which is very pure, is 9·000. It can be hammered into very thin leaves, or drawn into ſmall wires. Its tenacity is ſuch that a wire 0·078 inch thick can ſupport 302·26 lbs. avoirdupois. It melts at about 27° of Wedgewood, and then appears bluiſh green on the ſurface like melted gold. When allowed to cool very ſlowly it cryſtallizes in quadrangular pyramids, often inſerted into each other. Expoſed to heat it boils and flies off in vapour.

(1814.) Copper does not decompoſe water, even at a red heat, unleſs air be preſent. But if water be kept in a copper veſſel, a ring of *verdigris* forms round its edge, where the air and the water exert their joint action on the copper. When copper is expoſed to the air, it firſt becomes brown, and at laſt is covered with a green cruſt. This cruſt is poiſonous, and to prevent it from forming, the ſurface of copper veſſels is uſually coated with tin. Silver is found to anſwer this purpoſe much better; and platinum has been found to be the moſt durable, and the ſafeſt of all coatings for copper veſſels. An amalgum of platinum is rubbed upon the clean ſurface of the copper veſſel, and the mercury is afterwards expelled by heat.

(1815.) Copper combines with oxygen, and forms an oxide, if it be heated red hot, and expoſed to the air. Or if a plate of copper be heated red hot, and plunged under water alternately, it may be very ſoon converted into oxide. The copper contracts much on cooling, while the oxide contracts little, and hence the latter drops off in ſcales. If thin leaves of copper be kept heated below redneſs, the ſurface acquires beautifully variegated ſhades of orange yellow, and blue. Plates of this ſort are uſed to ornament children's toys. If copper have a ſtream of oxygen and hydrogen gas ſent over it while it is violently heated, it burns with an intenſely green flame, and is converted into an oxide.

(1816.) There are two oxides of copper at preſent known, the *protoxide* and *peroxide*. Mr Chenevix found the protoxide native in Cornwall, and it is of a *red* colour; but what is prepared artificially is of a fine *orange*. To prepare this oxide, copper is diſſolved in muriatic acid by the aſſiſtance of heat. The green liquid thus obtained is put into a phial with pieces of rolled copper, and cloſely corked. The liquid becomes dark brown and opaque, and is then thrown into a ſolution of potaſh, which precipitates the orange-coloured oxide. This oxide ſhould be waſhed and dried ſuddenly, as it attracts more oxygen and becomes bluiſh green. After it is dried it retains its colour, and is uſed as a paint. Its components are

88·5	copper
11·5	oxygen
100	

(1817.) The *peroxide*, or black oxide of copper may be obtained by keeping the ſcales which drop from the ſurface of red hot copper, ſome time, red hot, in an open veſſel. They change from a violet red to a black colour.—Or the ſame oxide may be obtained by precipitating copper from ſolution in ſulphuric or nitric acid by means of potaſh. The precipitate being waſhed, and dried by heat, is peroxide. If this oxide be mixed with and heated red hot, the whole is converted into the orange coloured oxide deſcribed above. The peroxide contains

80	parts of copper
20	oxygen
100	

(1818.) In reducing copper into its metallic ſtate the ſulphur and other mineralizing ingredients are firſt expelled by heat in the proceſs called *roaſting*. The oxides are then reduced by being heated with charcoal, or fat oils. They may alſo be reduced by being heated with ſome metals, eſpecially zinc.

(1819.) Copper combines readily with ſulphur, and with phoſphorus, forming *ſulphuret* and *phoſphuret of copper*.—If equal parts of copper and ſulphur be placed in alternate layers in a crucible, they melt and combine at a red heat. The ſulphuret thus obtained is much more fuſible than

copper; it is brittle, and of a black or deep blue grey colour. It conſiſts of 78 parts copper
21 ſulphur

100

Copper may combine with an additional doze of ſulphur, ſo as to form a *ſuper ſulphuret*. This is found native, and is commonly known under the name of *copper pyrites*. It is brittle, of a yellow colour, and metallic luſtre.

(1820.) If eight parts of copper filings, and three parts of flowers of ſulphur, by weight, be put into a glaſs receiver which is placed upon burning coals, they firſt melt with an exploſion, and form a *ſulphuret of copper*, and become red hot. When taken from the fire they glow for ſome time like a live coal; and what is remarkable, they exhibit this appearance though the glaſs veſſel ſhould be filled with hydrogen or azote, or other gaſes which are not ſupporters of combuſtion; or even when the veſſel is filled with water or mercury. As this brilliant experiment is an apparent example of combuſtion without the preſence of oxygen, much controverſy has ariſen among chemiſts reſpecting the cauſe to which it ought to be aſcribed. (ſee 394, &c.)

(1821.) *Phoſphuret of copper* may be formed by by melting together 16 parts of copper, 16 of phoſphoric glaſs mixed with one part of charcoal. Or it may be formed by throwing pieces of phoſphorus upon red hot copper in a crucible. Phoſphuret of copper is white, brittle, and harder than iron. It is more fuſible than copper, and cryſtallizes in four-ſided priſms. Its ſpecific gravity is 7·1220, and it conſiſts of
80 parts copper
20 phoſphorus

100.

Heat expels moſt of the phoſphorus from this compound, but Sage has ſhewn that though frequently melted, it ſtill retains about a twelfth. This *ſubphoſphuret* is more fuſible than copper, and has the hardneſs, colour and takes the poliſh, of ſteel.—It is poſſible the ancients may have been acquainted with this compound, as we cannot conceive how they could make efficient cutting inſtruments from copper or bronze.

(1822.) Copper combines with moſt of the metals, and forms alloys, ſome of which are of great utility. The order of its affinity for metals is the following.

Copper.
Gold,
Silver,
Arſenic,
Iron,
Manganeſe,
Zinc,
Antimony,
Platinum,
Tin,
Lead,
Nickel,
Biſmuth,
Cobalt,
Mercury.

(1823.) The alloy of gold and copper is formed by melting the metals together. A little copper heightens the colour of gold, increaſes its hardneſs, without diminiſhing its ductility. This alloy is more fuſible than pure gold, and is uſed as a ſolder for that metal. The ſtandard gold of Britain, of which the coin is formed, contains 1/12th of copper, or ſilver, or a mixture of both. The alloy of gold and copper expands, ſo that the mixture is of leſs ſpecific gravity than the medium. Thus Mr Hatchet aſcertained that 916⅔ parts of gold united to 83⅓ parts of copper, inſtead of occupying the ſpace of 1000 as ſhould have happened had there been no expanſion, became 1024. The ſpecific gravity of the alloy of gold and ſilver differs little from the mean; but if one 24th of copper and one 24th of ſilver be added to gold, the bulk of the alloy is increaſed to 2767, though their ſeparate bulks was only 2700. A pound of ſtandard gold is coined into 44½ guineas.

(1824.) In a ſtrong heat, platinum alloys with copper. The platinum entirely changes the colour of the copper unleſs it be uſed ſparingly. We owe this alloy to Dr Lewis, and it has been applied with ſucceſs in the conſtruction of the mirrors of reflecting teleſcopes. It does not tarniſh, is hard, ductile, and takes a fine poliſh.

(1825.) Silver alloys with copper by fuſion. The alloy is harder and more ſonorous than pure ſilver, and it retains its white colour when the proportion of copper exceeds one half. Britiſh ſtandard ſilver, of which the coin is made, contains one part of copper to 12⅓ of ſilver. Like that of gold, the alloy of copper and ſilver occupies a greater bulk than the ſeparate bulks of the metals. The new coin of France contains 137 parts ſilver, and 7 copper. The old coin contained 261 parts ſilver, and 27 copper. The Spaniſh dollar contains a ſixth of its weight of alloy, the rupee only a fortieth part of its weight.

(1826.) Mercury does not combine with copper when cold. But if a ſmall rill of melted copper be poured into mercury heated nearly to its boiling point, they combine and form a ſoft amalgam. Or this amalgam may be formed by rubbing 2 parts of mercury, 2½ parts of verdegris, and one part of common ſalt with acetous acid in a veſſel over a moderate fire, adding acetous acid from time to time as it evaporates. The amalgam is nearly fluid at firſt; but being waſhed, and poured into a mould, it cryſtallizes and conſolidates. The ſame amalgam may be formed by keeping plates of copper in a ſolution of nitrate of mercury. This amalgam is white, and ſo ſoft at firſt that it is ſuſceptible of the moſt delicate impreſſions; but it afterwards hardens by expoſure to the air. Heat expels the mercury from it as from the other amalgams, and this is one reaſon why mercury is a proper vehicle to convey the more precious metals, and lay them as a coating upon the ſurface of the inferior metals. Other alloys of copper will be mentioned when we come to treat of the metals with which it combines.

(1827.) Copper does not combine with the acids, unleſs it be previouſly oxidized, and the order of the affinities of oxide of copper with acids, according to Bergman, is the following.

OXIDE OF COPPER.

Oxalic acid,
Tartaric,
Muriatic,
Sulphuric,
Saclatic,
Nitric,
Arſenic,
Phoſphoric,
Succinic,
Fluoric,
Citric,
Lactic,
Acetic,
Boracic,
Pruſſic,
Carbonic.

I. SULPHATE *of* COPPER.

(1828.) Sulphuric acid does not act upon copper unleſs it be boiled upon it. In this caſe a conſiderable part of the acid is decompoſed, ſulphurous acid gas is evolved, the copper is converted into an oxide which is diſſolved in that part of the acid that remains undecompoſed. As this ſalt is of great uſe in dyeing and other arts, its formation would be too expenſive were it made from the direct combination of ſulphuric acid with oxide of copper. It is commonly made from *copper pyrites*, which are roaſted to a certain extent, and afterwards plunged into boiling water, in a copper boiler, to extract the ſalt thus formed. In Perry's mine alluded to (1812.) and in many others in various parts of the world, where the ore conſiſts of *copper pyrites*, the ſulphur is oxygenated, in the bowels of the earth, by the decompoſition of water, or by the admiſſion of air in conſequence of working the mine. The water which flows from ſuch mines, being boiled to the proper conſiſtency, forms cryſtals of ſulphate of copper. In ſome parts of France this ſalt is formed by firſt making a *ſulphuret of copper* by placing alternate layers of plates of copper and flowers of ſulphur, and expoſing them, ſome time, to a red heat, with acceſs of air. The maſs is then plunged into a copper boiler, charged with boiling water, which extracts all the ſalt previouſly formed. The maſs is again heated, with admiſſion of air, replunged in the boiling water, and the proceſs continued until the water is ſaturated with the ſalt, when it is allowed to cryſtallize.

(1829.) The ſalt, thus obtained, is of a deep and beautiful blue colour. It has hence acquired the names of *blue vitriol, blue copperas*, and *vitriol of copper*. It exiſts in three different ſtates, namely *ſuperſulphate, ſulphate*, and *ſubſulphate*.

(1830.) The *ſuperſulphate* contains the acid in exceſs, and therefore renders vegetable blues red. Its taſte is ſtrongly ſtyptic and metallic, and when ſwallowed is poiſonous. Surgeons employ it as a cauſtic, to deſtroy fungous excreſſences. It cryſtallizes in oblique parallelopipeds; ſometimes into octahedrons, and dodecahedrons. It is ſoluble in 4 parts of water at 60°, and in 1·6 of water at 144°. Expoſed to the air it effloreſces, and forms a greeniſh white cruſt. Heat expels its acid, and black oxide of copper remains behind.

(1831.) This ſalt is decompoſed by the alkalies and earths, the alkaline carbonates, borates, and earths. Thoſe metallic ſalts alſo decompoſe it, whoſe baſis forms a nearly inſoluble compound with ſulphuric acid. Of this we have an example in the ſalts of lead. It is alſo decompoſed by all the earthy ſalts whoſe baſe forms nearly inſoluble compounds with ſulphuric acid; ſuch as ſalts of lime, barytes, and others. Such metals as have a ſtronger affinity for ſulphuric acid than copper alſo decompoſe this ſalt, and precipitate the copper in its metallic ſtate. Hence if a plate of iron, or a knife, be wetted, and then rubbed with a fragment of this ſalt, it is ſuddenly coated with copper. Or if a piece of poliſhed iron be plunged into a ſolution of this ſalt, the ſame effect enſues. This is the reaſon why iron is employed to precipitate the copper from this ſalt, which is diſſolved in the waters of many mines, as mentioned. (1812.) There are ſome mines where more profit, and much better copper, are made in this way, than from working the ores.

(1832.) We have two analyſes of this ſalt, one by Mr Prouſt, the other by Mr Chenevix. They differ only in Mr Chenevix' ſuppoſing, that the oxide in this ſalt is combined with hydrogen. The following is the reſult of their analyſes.

	Mr Prouſt.		*Mr Chenevix.*
Sulphuric acid	33	do.	33
Oxide of copper	32	Hydrate of copper	42
Water	35	do.	25
	100		100

(1833.) When equal parts of this ſalt, and of muriate of amonia, are mixed together, they form a triple compound. This triple ſalt forms a ſympathetic ink. Lines drawn with it on paper are inviſible when cold, but aſſume a yellow colour when heated. The colour again diſappears when the paper is cooled.

(1834.) No particulars reſpecting the *ſulphate*, or *ſubſulphate* of this ſalt ſeem deſerving of notice, except that they do not change vegetable blues. In commerce theſe ſalts are confounded with each other, though the *ſuperſulphate* predominates. The ſubſulphate is inſoluble in water, and may be formed by adding ſuch a ſmall proportion of pure potaſh as may be ſufficient to neutraliſe the exceſs of acid in the compoſition of the *ſuperſulphate*, and a little more. A green coloured powder appears, and ſwims in the ſolution, which being collected, waſhed and dried, Mr Prouſt aſcertained to conſiſt of

18	ſulphuric acid,
68	oxide of copper,
14	water,
100	

II. SULPHITE *of* COPPER,

(1835.) Is formed by combining ſulphurous acid with oxide of copper, or by mixing ſolutions of ſulphite of ſoda and ſulphate of copper. In this way two ſalts are formed, one of which has exceſs of baſe, and is inſoluble in water: the other has exceſs of acid, and is ſoluble and cryſtallizable.

III. Nitrate *of* Copper.

(1836.) The nitric acid is rapidly decompoſed by copper. An oxide is formed, which diſſolves in that part of the acid which is not decompoſed. The ſalt thus formed is of a fine blue colour, and by ſlow evaporation yields long parallelopiped cryſtals. Their ſpecific gravity is 2·174. They are very cauſtic, and deliqueſce in the air. Heat expels their water and part of their acid. On burning coals they detonate feebly; and they detonate violently when mixed with phoſphorus and ſtruck with a hammer. When gently moiſtened, and wrapped in a ſlip of tinfoil, they burſt it aſunder. Heat is produced, and the tinfoil often takes fire. When a quantity of potaſh is poured into a ſolution of nitrate of copper, which is inſufficient to decompoſe the whole, a beautiful green precipitate enſues, which is *ſubnitrate of copper*. The ſame may be obtained by diſtilling the nitrate in a retort. The ſubnitrate is abſolutely inſoluble in water. To heighten the colour, lime is thrown into the ſolution, after the potaſh, and it is agitated during ſome time. In this way the pigment called *verditer*, which is employed in ſtaining paper, and for other purpoſes, is prepared. The components of this ſalt, according to Prouſt, are

67	oxide of copper
16	nitric acid
17	water
100	

IV. Muriate *of* Copper.

(1837.) This ſalt occurs in two ſeveral ſtates, namely of a *muriate* and *oxymuriate*. Mr Chenevix obtained the muriate by mixing in a mortar 57·5 parts of the black oxide of copper with 50 parts of copper obtained by precipitation from acid ſolution by means of a plate of iron. The mixture being put, with muriatic acid, in a well ſtopped phial, a violent heat enſued, and the whole was diſſolved except 7·5 of metallic copper. The liquor acquired a deep orange colour.

(1838.) This ſalt cryſtallizes in tetrahedrons, when much diluted with water, it precipitates in white powder, being deprived of the acid which kept it in ſolution. If this powder be repeatedly waſhed with water, the acid is wholly carried off, and the orange oxide of copper remains. It is compoſed of about

24·75	muriatic acid
70·25	protoxide of copper
5·00	water
100	

(1839.) The *oxymuriate of copper* is obtained by diſſolving copper in muriatic acid by the aſſiſtance of heat, when hydrogen gas is evolved, and part of the acid flies off in vapour. Or it may be obtained by throwing oxide of copper into cold muriatic acid. The ſolution is of a fine green colour, and being concentrated, yields rectangular parallelopiped cryſtals, of a graſs green colour. This ſalt is very cauſtic, eaſily ſoluble in water, and deliqueſces in the air. Its ſpecific gravity is 1·6775. This ſalt may be diſtilled to dryneſs without change. But if the heat be increaſed, oxymuriatic acid comes over with ſome oxygen from the copper, and there remains *muriate of copper*, of a white colour, already deſcribed. The conſtituents of this ſalt, according to Prouſt, are

40	peroxide of copper
24	oxymuriatic acid
36	water
100	

(1840.) Mr Chenevix formed a *hyperoxymuriate of copper*, by directing a ſtream of oxymuriatic acid gas through water, in which oxide of copper was ſuſpended. The properties of this ſalt have not been examined; but it is likely to prove a fulminating ſalt.

V. Fluate *of* Copper.
VI. Borate *of* Copper.
VII. Phosphate *of* Copper.

(1841.) As theſe ſalts have not been applied to any uſe, we eſteem a deſcription of them unneceſſary.

VIII. Carbonate *of* Copper.

(1842.) This ſalt occurs native, and it is known among mineralogiſts under the name of *malachite*. It may be formed by precipitating a ſolution of nitrate of copper in boiling water, by means of a fixed alkaline carbonate. The alkali combines with the nitric acid, while the carbonic acid combines with the oxide of copper. It is inſoluble in water, ſhould be carefully waſhed, and expoſed to the light of the ſun. It acquires a fine apple green colour, and is uſed as a paint. Its components, according to Prouſt, are

69·5	peroxide of copper
25·0	carbonic acid
5·5	water
100	

IX. Arseniate *of* Copper.

(1843.) May be formed by digeſting arſenic acid on copper; or by mixing a ſolution of an alkaline arſeniate with nitrate of copper. The arſeniate of copper has lately been found native in the mine Huel Gorland in Cornwall, and a deſcription and analyſis of it were publiſhed by the Count de Bournon and Mr Chenevix in the Philoſophical Tranſactions for 1801. There are four varieties of it found there.

(1844.) An arſeniate of copper was propoſed by Mr Scheele as a paint, and is called *Scheele's green*. It is prepared by diſſolving two parts of ſulphate of copper in 44 parts of water; and two parts of common potaſh and nearly one part of white arſenic in powder in 44 parts of hot water. Both ſolutions being kept hot, the ſolution of copper is gradually added to the arſeniate of potaſh, and the whole is frequently ſtirred. The mixture gradually depoſits the arſeniate of copper in the form of a fine green powder. The powder being well waſhed and dried is ready for uſe.

being paſſed, while hot, between iron rollers moved by great force; but it cannot be ſo much extended as gold or ſilver. It may be drawn into wires as fine as a human hair, and a wire 0·078 of an inch in diameter ſuſtains 549·25 lbs. avoirdupois.

(1856.) Sir George M'Kenzie aſcertained that iron melts at 158° of Wedgewood. Its ſtructure is fibrous, or like threads bundled together; but the form of its cryſtals has not been obſerved. Expoſed to the air, eſpecially if it be moiſt, it attracts oxygen, and its ſurface is covered with *ruſt* of a brown or yellow colour. Iron filings kept in water not under 70° decompoſe the water, and hydrogen gas eſcapes. If the filings be put into a retort, and have the water boiled upon them, it is decompoſed more ſpeedily, and the hydrogen gas may be collected in a jar over water. If the ſteam of water be paſſed through a red hot iron tube, or through a porcelain tube containing chips of iron, it is ſpeedily decompoſed. (525.) The oxygen combines with the iron, while the hydrogen aſſumes its elaſtic ſtate, and may be collected in jars. This is one of the eaſieſt methods of procuring pure hydrogen gas. If a ſmall iron wire, made into the form of a cork ſcrew, by being twiſted round a cylinder, have a ſmall tuft of cotton dipped in liquid tallow attached to one end of it, and the other end faſtened in a cork: on lighting the cotton, and plunging it into a bottle filled with oxygen gas, the wire takes fire and burns with great brilliancy. In all theſe caſes the iron combines with oxygen, and is converted into an oxide.

(1857.) There are only two oxides of iron, the *protoxide*, and the *peroxide*. The protoxide is formed by all the methods already detailed; and likewiſe by precipitating iron from its ſolution in ſulphuric acid by means of potaſh, and quickly drying the precipitate in cloſe veſſels. The protoxide of iron is a black powder, which was long celebrated as a medicine under the name of *martial ethiops*. It is commonly prepared by keeping iron filings under water at a higher temperature than 70°. This oxide is magnetic and contains

73 parts of iron
27 oxygen
——
100

(1858.) The *peroxide* may be formed by keeping iron filings red hot in an open veſſel, with conſtant ſtirring: or by treating the protoxide in the ſame manner. Or it may be formed by expoſing a diluted ſolution of iron in ſulphuric acid, for a long time to the air, and afterwards precipitating by an alkali. This oxide is found native in great abundance; and common ruſt of iron is this oxide combined with carbonic acid. It is of a dark red colour, and was formerly called *ſaffron of Mars*. It is often uſed as a paint, and is compoſed, according to Prouſt, of

52 parts iron
48 oxygen
——
100

(1859.) Iron combines with all the ſimple combuſtibles. When hydrogen gas is extracted by the action of diluted ſulphuric acid on iron, part of the iron, or rather of its oxide, is carried along with the gas, and is gradually depoſited in the form of a brown powder.

(1860.) The combination of iron with carbon, or *carburet of iron*, abounds native, and is known under the names of *plumbago* or *black lead*; and from its uſe in making pencils, it is ſometimes called *graphite*. Only the pureſt ſpecies is uſed for pencils, which is found in Cumberland, and it is found equally pure in the hills of Struey, contiguous to Strathglaſs, Inverneſsſhire. As it reſiſts a very violent heat when air is excluded, it is uſed in making crucibles. Dr Lewis expoſed this ſubſtance to a ſtrong heat, under a muffle, with acceſs of air, when the carbon was conſumed, and there remained a dark brown matter moſt part of which was attracted by the magnet. Scheele deflagrated one part of this ſubſtance with ten of nitrate, and there remained only a little oxide of iron. Monge and Berthollet expoſed it to the heat of a powerful burning glaſs, in glaſs jars filled with oxygen gas, when $\frac{9}{10}$ths of it were conſumed, and converted into carbonic acid, and the remainder was iron. Hence they concluded that carburet of iron is compoſed of

90 carbon
10 iron
——
100

This compound is formed artificially in ironworks, and by a variety of proceſſes.

(1861.) Iron combines with phoſphorus, and forms a compound called *phoſphuret of iron*. It may be formed by melting in a crucible 16 parts of phoſphoric glaſs, 16 of iron, and half a part of charcoal. Or by melting equal parts of phoſphoric glaſs and iron filings: or by dropping ſmall bits of phoſphorus among iron filings heated red hot. This compound is magnetic, brittle, and has a white fracture. There is a ſpecies of iron *called cold ſhort iron*, becauſe it does not hammer when cold, though it hammers when heated. Bergman and Meyer, when employed in examining the cauſe of this property, diſcovered that a white powder might be ſeparated from this kind of iron, by means of ſulphuric acid, which by the uſual proceſs they converted into a metal, of a dark ſteel-grey colour, brittle, and not very ſoluble in acids. They thought they had diſcovered a new metal, to which Bergman gave the name of *ſyderum*, and Meyer of *hydroſiderum*. Scheele however aſcertained that this *ſiderum* is phoſphuret of iron.

(1862.) Iron combines with ſulphur, when equal parts of iron filings and powdered ſulphur are melted together in a crucible. This *ſulphuret of iron* is of a deep grey colour, brittle and very hard. If reduced to powder, and moiſtened with water, it abſorbs oxygen, and the compound is gradually converted into ſulphate of iron. If three parts of iron filings, and one of powdered ſulphur, by weight, be mixed and put into a glaſs veſſel, and heated upon burning coals, they melt and burn without the preſence of air, in the ſame way as a mixture of copper filings and ſulphur, though not with ſo much brilliancy. But if a conſiderable quantity of the mixture be heated in a covered crucible, the combuſtion is remarkably

brillia

brilliant, and even accompanied with an exploſion; and it laſts much longer than that of copper and ſulphur. If equal quantities of iron filings and ſulphur be mixed and made into a paſte with water, the water is decompoſed, and the mixture often takes fire though it be buried under ground. Lemeri firſt diſcovered this, and thinks it may account for the origin of volcanoes. For this reaſon heaps of coal, and coal-pits which contain much ſulphuret of iron, are often known to take fire ſpontaneouſly. This ſulphuret diſſolves in ſulphuric and muriatic acids, with an abundant emiſſion of ſulphureted hydrogen gas. This ſulphuret abounds in nature, and is called by mineralogiſts *magnetic pyrites*, becauſe it obeys the magnet. It is compoſed, according to Prouſt, of

62·5 iron
37·5 ſulphur
———
100

(1863.) The *pyrites* of iron, which abounds in nature, but has not been formed by art, contains a greater proportion of ſulphur than the laſt, and may be regarded as a *ſuperſulphuret* of *iron.* It is commonly cryſtallized in cubes, which are often indented into each other, and they are ſmooth, ſtriated, or radiated. Often theſe cubes are of conſiderable ſize, and they are much oftener very ſmall. They are of a braſs colour, and metallic luſtre when freſh broken. Very rarely its cryſtals are dodecahedrons. The ſulphuret of iron obeys the magnet, and may be converted into a magnet; but the *pyrites* neither obey nor acquire the magnetic power. The proportion of ſulphur in the compoſition of pyrites only varies about 2·19 per cent. According to Mr Hatchet the ſmooth cubed pyrites, which is the moſt common, conſiſts of

47·30 iron
52 70 ſulphur
———
100

(1864.) Iron is preſented in three ſtates, namely *pig iron* or *caſt iron*, *malleable* or *bar iron*, and *ſteel*. In the firſt ſtate it melts at 130^{d} of Wedgewood, and takes a fine impreſſion in a mould. The ſecond ſtate, or malleable iron, is what we have been treating of. The illuſtrious Bergman firſt paved the way for attaining a knowlege of the nature of *ſteel.* It is now aſcertained to be a compound of iron and pure carbon, not charcoal, but carbon as it exiſts in the diamond, and it is hence called *carbureted iron.* Morveau, at the ſuggeſtion of Clouet, incloſed a diamond in a ſmall crucible of pure iron, and covered it completely in a common crucible. Having ſubjected it to a ſufficient heat, the diamond diſappeared, and the iron was converted into ſteel. Similar experiments were repeated by Sir George M'Kenzie, with ſimilar reſults; and it appeared that ſteel is iron combined with about $\frac{1}{20}$th of its weight of carbon. The proportion of carbon varies in the different kinds of ſteel. Steel may be diſtinguiſhed from iron by dropping a little diluted nitric acid upon a plate of it and afterwards waſhing it off. It leaves a black ſpot upon the ſteel, which is owing to the oxidizement of its carbon; while the ſpot it leaves upon iron is whitiſh green.

(1865.) Steel is brittle while cold, cuts glaſs, affords ſparks from flint, and retains the magnetic virtue any length of time. It is elaſtic, and loſes its hardneſs after being heated red hot and ſlowly cooled. It may be hammered into thinner plates than iron. Its ſpecific gravity varies from 7·78 to 7·84. If it be repeatedly heated in an open veſſel, and hammered, its carbon is burnt off, and it returns to the ſtate of wrought iron. Its malleability is greateſt at a red heat, and it is ſcarcely malleable at a white heat.

(1866.) *Caſt-iron* contains a greater proportion of carbon than ſteel. Clouet thinks its carbon amounts to $\frac{1}{8}$ part of the iron. It alſo contains various proportions of oxide of iron, phoſphuret, ſometimes ſulphuret of iron, and ſilica. It is converted into malleable iron by burning off the charcoal and depriving the iron of oxygen. Clouet mixed caſt iron with $\frac{1}{4}$th of its weight of black oxide of iron, and having heated them violently, the oxygen of the oxide combined with the carbon of the caſt iron, and the iron was converted into its pure, or malleable ſtate. Dr Black has ſhewn that the common proceſs of refining iron is ſimilar in all reſpects to this of Clouet.

(1867.) There are three proceſſes by which ſteel is formed, from which it is diſtinguiſhed by the names of *natural ſteel*, *ſteel* of *cementation*, and *caſt ſteel*. *Natural ſteel* is formed by heating caſt iron violently in a furnace, while its ſurface is covered with a maſs of melted ſcoriæ. The oxygen in the caſt iron combines with part of the carbon, and flies off in the ſtate of carbonic acid gas; while the remainder of the carbon combines with the pure iron and forms ſteel. This ſteel is of inferior value to the other ſpecies.

(1868.) The *ſteel of cementation* is formed by placing bars of pure iron and powdered charcoal in alternate layers, and heating them in a cloſe furnace during eight or ten days. The bars combine with the carbon in the charcoal, and form ſteel, which in Britain, where the proceſs was firſt invented, is known by the name of *bliſtered ſteel*. It has a finer grain, is harder and more elaſtic than the foregoing.

(1869.) *Caſt ſteel* was firſt diſcovered by Mr Huntman of Sheffield in 1750. It is formed by melting bliſtered ſteel in a cloſe crucible, mixed with a certain proportion of pounded glaſs and charcoal powder. According to Clouet it may be formed by melting 30 parts of iron, with one of charcoal, and one part of pounded glaſs: or by encloſing iron in a crucible with a mixture of equal parts of chalk and clay, and keeping them a ſufficient time at a white heat. Clouet thinks the iron imbibes carbon from the decompoſition of the carbonic acid of the chalk. Caſt-ſteel contains a greater proportion of carbon than any of the preceding, and it is hence fuſible like caſt iron, and it does not weld upon iron. It is uſed for making razors, ſurgeons' inſtruments, which are firſt caſt in a mould, and afterwards poliſhed. It is very compact, and admits of the fineſt poliſh.

(1870.) Cutting inſtruments of ſteel are hardened by heating them to a cherry red, and then plunging them into a cold liquid. After they are hardened, it is neceſſary to *temper* them, as it is called, that they may take a fine edge. This is done by plunging them in oil heated to a particular temperature, until the inſtruments acquire a particular colour; and the colour varies in regular ſucceſſion according to the temperature. About 450° they have a pale yellowiſh tinge. At 460° they acquire a ſtraw-yellow colour, which is the temper of razors, pen-knives, and other fine edged inſtruments. At 500° the colour is a bright browniſh metallic yellow. Several variations of colour take place until the temperature be raiſed to 580°, when the colour becomes of an uniform deep blue, which is the temper of watch ſprings, and of the moſt elaſtic ſteel inſtruments.

(1871.) Iron forms alloys with various metals. With gold it unites in all its ſtates of caſt-iron, ſteel, and ſoft iron. Mr Hatchet obſerved that an alloy of one part iron and 11 gold is of a pale yellowiſh grey colour, approaching to a dull white, is remarkably ductile, and may be rolled into plates, or ſtamped into coin, without annealing. This alloy is harder than gold, and of leſs than the medium ſpecific gravity of the metals. When the proportion of the iron is conſiderably greater, Dr Lewis found the alloy capable of making edge-tools, and its colour that of ſilver. The iron continues magnetic, and gold is an excellent ſolder for iron. As the alloys of iron with platinum, ſilver, and copper, have not been applied to any uſe, we forbear entering into a deſcription of them.

(1872.) According to Bergman, the affinities of iron for metals are in the following order.

Nickel,
Cobalt,
Manganeſe,
Arſenic,
Copper,
Gold,
Silver,
Tin,
Antimony,
Platinum,
Biſmuth,
Lead,
Mercury.

(1873.) The two oxides of iron combine with acids, forming ſalts, to which the alchymiſts aſſigned the name of *martial*. Several of theſe ſalts being of great uſe in manufactures, in dyeing, and various arts, it may be proper to give a ſhort account of thoſe which are of the greateſt utility.

(1874.) The order of affinity of the *protoxide* or black oxide of iron for acids, according to Bergman, is the following.

OXIDE *of* IRON.

Oxalic acid,
Tartaric,
Camphoric,
Sulphuric,
Saclactic,
Muriatic,
Nitric,
Phoſphoric,
Arſenic,
Fluoric,
Succinic,
Citric,
Lactic,
Acetic,
Boracic,
Pruſſic,
Carbonic.

I. SULPHATE *of* IRON.

(1875.) When concentrated ſulphuric acid acts upon iron, with the aſſiſtance of heat, the acid is ſlowly decompoſed, ſulphurous acid gas eſcapes, and the iron is oxidized. But when diluted ſulphuric acid is made to act upon iron, the water is decompoſed, abundance of hydrogen gas eſcapes, the iron is oxidized, and its oxide diſſolved in the ſulphuric acid. This compound forms *ſulphate of iron*, a ſalt which is known in commerce under the names of *green vitriol*, or *copperas*. Its ſolution is of a green colour, and when ſpeedily evaporated it yields cryſtals of a fine green colour, which are tranſparent rhomboidal priſms. The acid is always in exceſs, and it reddens vegetable blues. Its ſpecific gravity is 1·8399. When expoſed to the air its baſis abſorbs an additional doze of oxygen, which forms a yellow powder upon its ſurface, and this change takes place more rapidly if it be moiſtened with water. The ſame takes place if a ſolution of the ſalt be expoſed to the air, unleſs the acid be conſiderably in exceſs. This ſalt is ſoluble in about two parts of cold water, and in $\frac{3}{4}$ths of its weight of boiling water.

(1876.) When diſtilled it firſt yields water ſlightly acidulated, and afterwards a ſtrong fuming acid which was formerly known by the name of *glacial oil of vitriol*, which is a compound of the ſulphuric and ſulphurous acids. After being ſtrongly heated, there remains a red powder, formerly known by the name of *colcothar of vitriol*. The components of this ſalt are, according to

	Bergman.	*Kirwan.*
Sulphuric acid	39	26
Oxide of iron	23	28
Water	38	46
	100	100

(1877.) Prouſt firſt diſtinguiſhed between the *oxyſulphate of iron* and the *ſulphate*. This has a yellowiſh red colour, and its baſe contains an exceſs of oxygen. It is very ſoluble in water, and it remains in the liquor after the ſulphate of iron has cryſtallized. It is hence called the *mother water of vitriol*. A portion of it is always mixed with the *green vitriol* of commerce, from which it may be waſhed by water. It does not cryſtallize, but when expoſed to the air it gradually depoſits red oxide, or oxyſulphate with exceſs of baſe. This ſalt may be formed by pouring nitric acid into a warm ſolution of ſulphate of iron, or by treating this ſalt with oxymuriatic acid, and other compounds which freely give out oxygen. On the other hand it may be decompoſed by the filings of iron, of tin, zinc, &c. which ſeparate from its baſe its exceſs of oxygen, and the ſalt is changed into the common ſulphate of iron. Sulphureted hydrogen gas alſo effects this change. It ſeems to be on the baſis of the oxyſulphate of iron that the infuſion of nut-galls operates in the formation of ink and the black dye, and the pruſſic acid in producing the pruſſian blue.

(1878.) The ſulphate of iron combines with many other metallic ſulphates, producing double ſulphates; and in ſome caſes it combines with two of theſe ſalts, producing triple ſulphates. It alſo combines with ſulphate of potaſh, forming a ſulphate of iron and potaſh.

(1879.) The ſulphate of iron being of extenſive uſe in arts and manufactures, it is not neceſſary to form it by combining the acid with its baſe. It is formed from *martial pyrites*, which abound in nature. At Hurlet near Paiſley there is an extenſive manufacture of this ſalt, which has been long eſtabliſhed. It is formed from the grey ſulphuret of iron (1862) which is laid up in large heaps, and are occaſionally turned and expoſed to the air. The ſalt effloreſces on the ſurface of the pyrites, and is waſhed by rain into proper reſervoirs. As the acid is always conſiderably in exceſs, great quantities of old iron are put into the liquid to ſaturate the acid. The purified ſolution is then evaporated in large leaden boilers to the proper conſiſtency, when it is let into large wooden veſſels, where it depoſits cryſtals by ſlow cooling. When the braſs-coloured, or cryſtallized pyrites are operated upon, it is neceſſary to expel part of the ſulphur by heat, to render them brittle, and to admit the air to combine with them.

II. Sulphite *of* Iron.

(1880.) When liquid ſulphurous acid is poured upon iron filings, heat is produced, ſome hydrogen gas eſcapes, part of the acid is decompoſed and oxidizes the iron, and the oxide formed is diſſolved in the remaining part of the acid. The ſulphur which is ſeparated remains in combination with the ſalt. The colour is firſt a deep yellow, but ſoon aſſumes a greeniſh ſhade. The compound formed is ſulphite of iron and ſulphur. When expoſed to the air cryſtals of ſulphite of iron are depoſited, and at the ſame time a red powder. By expoſure to the air the cryſtals gradually change into ſulphate of iron.

III. Nitrate *of* Iron.

(1881.) Diluted nitric acid acts upon iron with great violence, and vaſt quantities of the nitrous oxide, and nitrous oxide gaſes eſcape. The iron is oxidized to a maximum, and is depoſited in the form of a red powder.

(1882.) But concentrated nitric acid acts upon iron very ſlowly, and little gas is evolved. The ſolution, when completed, is of a brown colour, and does not cryſtallize. When evaporated it depoſits a red powder, which, when ſtrongly heated parts with its acid, and the oxide remains in the form of a fine red powder. Hence to ſeparate iron from earths, Bergman recommended ſolution of the maſs by digeſting in nitric acid, evaporation to dryneſs, heating the reſiduum. The earthy ſalts may now be waſhed off by digeſting in water, while the oxide of iron remains in the form of a red inſoluble powder.

IV. Muriate *of* Iron.

(1883.) When muriatic acid gas acts upon iron filings, it changes them into a red oxide. At the ſame time its volume is enlarged by the acceſſion of hydrogen gas from the decompoſition of water, with which the gas had been combined.

(1884.) Liquid muriatic acid, eſpecially when diluted with water, acts rapidly upon iron. The iron is oxidized by the decompoſition of part of the water, much hydrogen gas eſcapes, and the acid combines with the oxide formed. Muriatic acid combines more readily than any other, both with the black and red oxides of iron, and hence is employed to remove ruſty ſtains from cloths and other ſubſtances. The ſalt formed with the black oxide is *muriate of iron*, and that with the red oxide is *oxymuriate of iron*.

(1885.) When muriatic acid is made to act upon iron filings, while the air is excluded, or upon ſulphuret of iron, a ſolution is obtained of a pale green colour. By evaporation this yields cryſtals of a pale green colour, conſiſting of *muriate of iron*, which are very ſoluble in water, and alſo in alcohol. The ſolution abſorbs oxygen from the air; and combines with a great quantity of nitrous gas.

(1886.) *Oxymuriate of iron* is formed by expoſing a ſolution of the preceding ſalt to the air, or by pouring into it nitric acid, or by diſſolving the red oxide of iron in muriatic acid. The ſolution is of a deep brown colour, its ſmell peculiar, and its taſte very aſtringent. It does not cryſtallize, and when ſulphuric acid is dropped into its ſolution, it emits oxymuriatic acid. It does not abſorb nitrous gas, and ſulphureted hydrogen gas paſſed through it, by abſorbing part of its oxygen, converts it into *muriate of iron*.

V. Hyperoxymuriate *of* Iron.
VI. Fluate *of* Iron.
VII. Borate *of* Iron.

We deem a deſcription of theſe ſalts unneceſſary.

VIII. Phosphate *of* Iron.

(1887.) The phoſphoric acid acts very ſlowly upon iron. But if a ſolution of ſulphate of iron be mixed with a ſolution of phoſphate of potaſh, a blue inſoluble powder falls, which is phoſphate of iron. This compound is ſometimes found in bogs, particularly at Swindridge moor in Airſhire, and has obtained the name of *native pruſſian blue*. It is ſometimes white at firſt, but always becomes blue by expoſure to the air. By the analyſis of Laugier, it ſeems to be compoſed of

21	phoſphoric acid,
45	black oxide of iron,
34	water.
100	

(1888.) If ſolutions of oxymuriate of iron and phoſphate of potaſh be mixed, a white powder is obtained which is *oxyphoſphate of iron*. It is almoſt inſoluble in water, but is ſoluble in acids, from which it is precipitated undecompoſed by ammonia.

(1889.) Alkalies deprive this compound of part of its acid, and there remains a *ſuboxyſulphate of iron* with exceſs of baſe, in the form of a browniſh red powder. This powder is not known to be ſoluble in water or any of the acids, but it is ſoluble in the white of an egg, and in the ſerum of the blood, to which it communicates a browniſh red colour. A portion of fixed alkali increaſes its ſolubility, and heightens its colour. The preſence of this ſubſtance is ſuppoſed to occaſion the red colour of the blood.

IX. Carbonate *of* Iron.

(1890.) The liquid carbonic acid acts very ſlowly upon iron, and when a ſolution is obtained and expoſed to the air, the iron is depoſited in the form of an oxide, and boiling precipitates it in the form of yellow ochre. All thoſe mineral waters which are known by the name of *chalybeat*, owe their properties to carbonate of iron diſſolved in them. They form an irrideſcent ſcum upon their ſurface, and depoſit ochre when expoſed to the air. Carbonate of iron may alſo be formed by precipitating a ſolution of ſulphate of iron by means of an alkaline carbonate. The colour of this carbonate is green, owing to water in its compoſition, and it becomes black if air be excluded. Carbonate of iron has been found native, cryſtallized in rhombs at Eulenloh in Bareuth. It is brittle, of a greeniſh yellow colour, ſomewhat tranſparent, and its ſpecific gravity is 3·333. It poſſeſſes the ſingular property of becoming a permanent magnet when heated red hot. According to Bucholz, its conſtituents are

36·0 carbonic acid,
59·5 black oxide of iron,
2·0 water.

97·5

(1891.) Ruſt is an oxycarbonate of iron, or the carbonic acid combined with the red oxide. Hence when diſſolved in acids, the carbonic acid eſcapes with efferveſcence. But in ruſt the oxide is in exceſs, and hence it is not ſoluble in water. Its conſtituents, according to Bergman, are

24 carbonic acid,
76 oxide.

100

X. Acetate *of* Iron.

(1892.) The next of the ſalts of iron which ſeems deſerving of notice, is that which is formed by the acetic acid. This acid, like the others, diſſolves iron with efferveſcence, which is owing to the decompoſition of water. The acetic acid combines both with the black and with the red oxide of iron. With the black oxide it forms

(1893.) *Acetate of iron.* Mr Davy procured this ſalt by diſſolving ſulphuret of iron, we preſume the grey ſulphuret, in acetic acid. By evaporation the ſolution yields ſmall priſmatic cryſtals, of a green colour, whoſe ſpecific gravity is 1·368. It has a ſweetiſh ſtyptic taſte, and by expoſure to the air, or the application of heat, it attracts more oxygen, and is converted into

(1894.) *Oxacetate of iron.* This ſolution does not cryſtallize, but becomes gelatinous by evaporation. It is of a reddiſh brown colour, and is deliqueſcent. This ſalt more readily forms a dye upon vegetable ſubſtances than the ſulphate or any other ſalt of iron, which ſeems owing to the facility of its decompoſition. It is hence much uſed by calico printers, and is called by them *iron liquor*. It is prepared by diſſolving old iron in vinegar, which is previouſly fermented from rye, malt, grains, or molaſſes. The ſolution is performed in large open wooden vats, that oxygen may be attracted. Since Mr Davy has found that ſuch ſulphuret of iron as abounds at Hurlet, and other places, anſwers the purpoſe, perhaps this may be found much cheaper than iron itſelf. With this liquor they ſtrike various ſhades of colour, from a faint grey to a deep purple, or black.

XI. Oxalate *of* Iron.

(1895.) Oxalic acid diſſolves iron rapidly, with efferveſcence, and evolution of hydrogen gas. It forms ſalts with each of its oxides. With the black oxide it forms *oxalate of iron*, which is very ſoluble in water, of a ſweet aſtringent taſte, and by evaporation yields priſmatic cryſtals of a green colour. They are compoſed of

55 oxalic acid,
45 oxide.

100

(1896.) The *oxygenized oxalate* may be obtained by expoſing the former ſalt to the air in a digeſting heat, or by diſſolving the red oxide of iron in oxalic acid, or by precipitating the red oxide of iron from its ſolution in ſulphuric, by means of the oxalic acid. It is ſcarcely ſoluble in water, and is in the form of a fine red powder, inclining to yellow. Some think it might be uſed as a pigment.

(1897.) None of the acids diſſolve the oxides of iron, or even the gallate of iron, more readily than the oxalic acid. Hence it is much uſed for obliterating the ſtains of ink from linen. The expreſſed juice of ſorrel anſwers the ſame purpoſe. A ſuperoxalate of potaſh is ſold in this country for the ſame purpoſe, under the name of *eſſential ſalt of lemons*.

XII. Gallate *of* Iron.

(1898.) This ſalt conſtitutes the black dye, and gives the black colour to ink, for the preparation of which ſee (980). Prouſt obſerved that gallic acid does not occaſion any precipitate in ſalts of iron whoſe baſis is the black oxide, but with thoſe whoſe baſis is the red oxide, it produces an immediate black precipitate, ſome of which goes down, though it is ſo light that much of it remains ſuſpended. When mucilage or ſyrup are mixed in the ſolution, as in the formation of ink, the whole remains ſuſpended. The ſulphate of iron, from which ink is commonly formed, contains part of the black, and part of the red oxide, united to ſulphuric acid. When the gallic acid combines with the red oxide, it produced an immediate black precipitate. What combines with the black oxide remains colourleſs until it be farther oxygenated by expoſure to the air. Hence writing, which is faint at firſt, becomes blacker by expoſure to the air. The ſtronger acids diſſolve gallate of iron, and hence deſtroy the colour of writing, and of the black dye.

XIII. Pruſſiate *of* Iron.

(1899.) Prouſt firſt obſerved that the pruſſic acid combines with both the oxides of iron. With the black oxide it forms a white powder, and pruſſian blue. The firſt is called *pruſſiate of iron*, and is formed by dropping a ſolution of pruſſiate of potaſh into green vitriol, or ſulphate of iron. A white powder falls, which is pruſſiate of iron. By expoſure to the air it abſorbs oxygen, and is converted into

(1900.) *Oxypruſſiate of iron*, or pruſſian blue. This ſalt is alſo formed when pruſſiate of potaſh is dropped into red ſulphate of iron, or any of the oxygenized ſalts of iron. A beautiful blue precipitate enſues, which is the ſalt. When mixed with iron filings and water, and kept in a cloſe veſſel, the iron attracts the exceſs of oxygen, and converts it into white pruſſiate. Sulphureted hydrogen gas produces the ſame effect.

(1901.) Having ſtated the principal, or moſt uſeful ſalts which the oxides of iron form with acids, we may now obſerve that theſe oxides combine by fuſion with glaſs and enamels, producing various ſhades of colour, according to the quantity of the oxide, or its degree of oxidation. Thus the black oxide produces the green colour of bottle glaſs. The red oxide again, when applied in imitating the gems, produces various ſhades from a faint red, to a vivid crimſon. When the two oxides are mixed, they produce compound colours.

(1902.) If iron filings be fixed with hyperoxymuriate of potaſh, and the mixture be ſtruck with a hammer, or ſuddenly compreſſed, or kindled by a lighted match, a violent detonation enſues with a vivid red flame.

Sect. XI. Nickel.

(1903.) A mineral occurs in ſome parts of Germany, from which its appearance, obtained the name of *Kupfer-nickel*, or *falſe copper* among the miners. Hierne, the father of the Swediſh chemiſts, is the firſt perſon who deſcribed it, in a book *on the art of detecting metals*, publiſhed in 1694. Cronſted, in 1751 and 1754, aſſerted that this mineral contained a new metal. Bergman, by his experiments publiſhed in 1775, added additional confirmation to the concluſions of Cronſted.

(1904.) Nickel is a ſcarce mineral, and as it contains a variety of metals from which it is ſeparated with much difficulty, and the moſt effectual mode of its ſeparation ſtill uncertain, ſome degree of doubt ſtill remains whether it ought to be ranked as an original metal, or as a compound of various metals. This, however, muſt be left to future inveſtigation, and, in the mean time, nickel muſt be held as an original metal until its compoſition be aſcertained.

(1905.) The metals which chiefly abound in nickel are iron, arſenic, copper, biſmuth, and ſome cobalt. To ſeparate nickel from theſe is a work of great difficulty and labour, to accompliſh which various complex proceſſes have been adopted, which, as it is uncertain whether they have accompliſhed the object, we do not think it neceſſary to detail. During the moſt approved proceſſes for ſeparating this metal from others, the maſs loſes upwards of half its weight.

(1906.) Nickel, in its pureſt ſtate, is of a whiteneſs reſembling ſilver, and like the laſt it leaves a white trace on the ſurface of a poliſhed piece of baſalt. After fuſion its ſpecific gravity is 8·279, after hammering it is 8·666. Like iron it is malleable both cold and hot, and it may be hammered, or rolled, into plates not exceeding the 100th part of an inch in thickneſs.

(1907.) It is attracted by the magnet like iron, and is ſuſceptible of as ſtrong a magnetic virtue as iron. Its needles, when rendered magnetical, and freely ſuſpended, point to the north like thoſe of iron. This excites ſome degree of ſuſpicion that the baſis of this metal is iron combined with ſome unknown ſubſtance. It has been ſeen that iron is more powerfully magnetical in ſome of its compounds, than in its pure ſtate. It fuſes at 160° of Wedgewood, and it is not altered by the air, nor by the keeping it under water.

(1908.) Subjected to a moderate heat, nickel oxidizes; but like gold reſumes the metallic ſtate when expoſed to exceſſive heat. There are two oxides of nickel, the *protoxide* of a green, and the *peroxide* of a black colour.

(1909.) To obtain the protoxide, nickel is diſſolved in nitric acid, and precipitated by means of pure potaſh. The precipitate is of a green colour, and when dried by a faint red heat, darkens to an olive green. In this ſtate it contains nearly

78	nickel,
22	oxygen.
100	

The peroxide is formed by directing a ſtream of oxymuriatic acid gas through water in which the green oxide is ſuſpended. Part is diſſolved, and a black powder is formed, which is the peroxide. The proportion of its oxygen has not been aſcertained.

(1910.) Nickel combines with ſulphur and with phoſphorus; but as pure nickel does not ſeem to have been employed in theſe experiments, the compounds do not ſeem deſerving of notice.

(1911.) With regard to the alloys of nickel, ſo little is known reſpecting them, and that little ſo uncertain, that we ſee no propriety in entering into them. According to Bergman, the order of the affinities of nickel for other metals is as follows.

Nickel.

Iron,
Cobalt,
Arſenic,
Copper,
Gold,
Tin,
Antimony,
Platinum,
Biſmuth,
Lead,
Silver,
Zinc.

(1912.) Oxide of nickel combines with moſt of the acids, but as this metal is ſcarce, and the difficulty of obtaining it in a pure ſtate very great, if indeed it has yet been accompliſhed, the properties of its ſalts have not been much attended to. We therefore do not think it neceſſary to enter into a detailed deſcription of its ſalts, and ſhall only obſerve in general, that they are moſtly ſoluble in water, and the ſolution is of a beautiful green colour. Pruſſiate of potaſh occaſions a dull green precipitate: hydroſulphuret of potaſh a black precipitate: and the infuſion of galls a greyiſh white precipitate. As nickel abounds only in Saxony, Fourcroy thinks the Saxons uſe it, or rather oxides, to produce beautiful colours on their porcelain wares, which he thinks they keep a ſecret. He thence infers its oxides might be advantageouſly employed in enamel painting, and in colouring glaſs.

(1913.) According to Bergman the order of the affinity of the oxide of nickel for acids is the following.

Oxide *of* Nickel.

Oxalic acid,
Muriatic,
Sulphuric,
Tartaric,
Nitric,
Phoſphoric,
Fluoric,
Saclactic,
Succinic,
Citric,
Lactic,
Acetic,
Arſenic,
Boracic,
Pruſſic,
Carbonic.

Sect. XII. Tin.

(1914.) This metal was known in very early times, and ſeems to have been in common uſe during the lifetime of Moſes. It was procured by the Phenicians from Spain and Britain, and by them circulated over Aſia, while the products of that country were returned in exchange.

(1915.) Freſh tin is very brilliant, of a white colour, like ſilver, has a peculiar taſte, and when rubbed, a peculiar ſmell. After fuſion, its ſpecific gravity is 7·291, after hammering 7·299. It is very malleable, and may be beaten into leaves leſs than the thouſandth part of an inch in thickneſs. Its tenacity is not great, as a wire of this metal $\frac{1}{10}$th of an inch thick ſupports only 30 lbs. It is very flexible, and crackles when bent. It melts at 442° but does not evaporate except at a violent heat. When ſlowly cooled it cryſtallizes in rhomboidal priſms.

(1916.) The ores of tin have only been found in a few parts of the world, but where they occur they are always abundant. In Europe they are only found in three places, namely in Cornwal, in Gallicia in Spain on the borders of Portugal, and between Saxony and Bohemia in Germany. In Aſia tin abounds at Siam, and the iſland of Barka; and it is ſaid to have been diſcovered in Chili and Mexico in South America. They are only found in the primary mountains, from which they have been waſhed down, and much of the ore in Cornwal is obtained by waſhing the alluvial land. Tin occurs, 1. Native, which is commonly cryſtallized. 2. Combined with ſulphur, and called *tin pyrites*. This ore has only been found in Cornwal, and there is a large vein of it in the pariſh of St Agnes. 3. Combined with oxygen, forming an oxide called *tin-ſtone*. This is by far the moſt frequent ore of tin; and a variety of it occurs in Cornwal which paſſes under the name of *wood-tin*. Theſe ores often contain an admixture of copper, iron, ſilica, or other earths.

(1917.) The ſurface of tin is ſlightly oxidized by expoſure to the air, and it acquires a greyiſh white colour. Cold water does not ſenſibly alter this metal, but ſteam conveyed over red hot tin in a tube, is decompoſed, hydrogen gas is evolved, and the tin is converted into an oxide. When tin is melted in an open veſſel a grey powder forms upon its ſurface, which gradually becomes yellow. If it be violently heated it takes fire and is converted into a white oxide, which may be obtained in cryſtals.

(1918.) Prouſt has ſhewn that there are two oxides of tin, the protoxide of a *yellowiſh grey* colour, the peroxide which is *white*. The firſt oxide is formed when tin is heated ſome time in open veſſels. But it may be more perfectly formed by diſſolving tin in muriatic acid with the aſſiſtance of heat, or by occaſionally adding a little nitric acid. On adding an exceſs of potaſh a white powder falls, which is partly rediſſolved. The remainder aſſumes a grey colour, and metallic luſtre. It is ſoluble in acids, and ſtill abſorbs oxygen. It is compoſed of 80 tin,
20 oxygen.

100

(1919.) The peroxide is obtained by heating concentrated nitric acid upon tin. The acid is decompoſed with violent efferveſcence, and the tin is converted into a white powder. This oxide is ſoluble in potaſh, and in muriatic acid, and reſumes its metallic ſtate if a ſtream of ſulphureted hydrogen gas be directed through its ſolution. It conſiſts of about 72 tin,
28 oxygen.

100

(1920.) Of the ſimple combuſtibles tin only combines with ſulphur and phoſphorus. The ſulphuret of tin may be formed by fuſing the two bodies together, or by throwing bits of ſulphur upon the melted metal. This compound is of a bluiſh colour, a lamellated ſtructure, cryſtallizable, heavier than tin, brittle, and leſs fuſible.

(1921.) Sulphur alſo combines with the white oxide of tin, when they are mixed, and gradually heated in a retort. Some ſulphur and ſulphurous acid are diſengaged, and the remainder conſiſts of 40 parts of ſulphur and 60 of white oxide of tin. It is arranged in light flakes, which adhere to the ſkin, and are of a beautiful golden colour. Hence this compound was much extolled by the alchemiſts under the names of *aurum muſivum, muſcum*, or *moſaicum*, and is now called *ſulphureted oxide of tin*.

(1922.) The phoſphuret of tin may be formed by gradually dropping phoſphorus into melted tin, or by melting in a crucible equal parts of filings of tin and phoſphoric glaſs. Part of the tin combines with the oxygen of the glaſs, forming an oxide, while the remainder combines with the phoſphorus thus evolved. This compound cuts with a knife, and extends under the hammer, but ſeparates into laminæ. Its freſh cut has the colour of ſilver, but it changes to that of lead. Its filings thrown on burning coals take fire. According to Pelletier, it is compoſed of about

85 tin,
15 phoſphorus.
—
100

(1923.) Tin combines with moſt of the metals, and as many of its alloys are brittle, it was called *diabolus metallorum* by the older chemiſts.

(1924.) Tin unites with gold by fuſion, and renders it brittle, unleſs the proportion of tin does not exceed $\frac{1}{17}$th part. The alloys of gold and tin contract in bulk. Thus 11 gold and one tin has a pale whitiſh colour, and the original bulk of the two metals being 1000, after union it is reduced to 981. When an alloy of gold and tin is brought to a cherry red heat, the tin melts, and exudes from the gold, ſo that the latter falls in pieces.

(1925.) Tin alloys with platinum; and with ſilver it forms a very brittle and hard compound. The alloy of one part tin, and four ſilver, is as hard as bronze. Theſe metals contract when they unite.

(1926.) Tin readily diſſolves in cold mercury, and theſe metals combine in any proportion when mercury is poured into melted tin. An amalgam of three parts of mercury, and one of tin, cryſtallizes on cooling in the form of cubes, or of grey brilliant ſquare plates. To *ſilver* the back of looking glaſſes, a ſheet of tinfoil is ſpread upon a horizontal table, and mercury rubbed upon it with a hare's foot until the two metals combine. A poliſhed plate of glaſs is then ſlid over it, and preſſed down by weights. This ſqueezes out the exceſs of mercury, and in a ſhort time the tinfoil hardens and adheres to the glaſs, which is thus converted into a mirror.

(1927.) Tin readily combines with copper, and from their various proportions alloys are formed which are applicable to ſeveral uſeful purpoſes, ſuch as the formation of cannons, bronze for ſtatues, bell-metal, mirrors for teleſcopes, &c. When theſe metals unite, their bulk is diminiſhed, and Mr Briche has ſhewn that this effect increaſes with the proportion of tin. To mix the two metals completely, they ſhould be kept long in fuſion, and conſtantly ſtirred, otherwiſe the copper will ſink to the bottom with a ſmall proportion of tin, and the tin will remain at top with a ſmall proportion of copper.

(1928.) Gun-metal, or bronze, is compoſed of from 8 to 12 parts of tin, combined with 100 parts of copper. Pure copper requires moſt tin, and coarſe copper leaſt. Theſe are commonly called *braſs* guns, though braſs, properly ſpeaking, is an alloy of copper and zinc. They give a louder report than iron guns; but as they are apt to melt, or loſe their ſhape, iron guns are now generally preferred, eſpecially ſince they contrived to reduce them to the malleable ſtate, and to bore them from the ſolid. This alloy ſeems to have been the χαλκος of the Greeks, and the æs of the Romans, of which they made their cutting inſtruments, before the uſe of iron became general. It is heavier and more tenacious than copper; more fuſible, leſs altered by the air, brittle, and of a yellow colour.

(1929.) Bell-metal is uſually compoſed of three parts of copper and one of tin. It is a very hard, ſonorous, and elaſtic, and of a greyiſh white colour. The tin may be ſeparated by melting the alloy and throwing water upon it, when the water is decompoſed, and the tin oxidized and thrown out upon the ſurface. Church bells have leſs tin than clock bells, that they may not be too brittle, and ſmall bells have a portion of zinc in their compoſition.

(1930.) The alloy for mirrors of teleſcopes conſiſts of about two parts of copper and one of tin. The ancients made their mirrors of a ſimilar alloy. This alloy is very hard, admits of a fine poliſh and then it reſembles ſteel. But there are many other compounds uſed for the ſpecula of teleſcopes.

(1931.) In order to avert the poiſonous effects of copper when employed in kitchen utenſils, they are coated over with a covering of tin. To do this, the interior ſurface is firſt ſcraped very clean with an iron inſtrument, and rubbed with ſal ammoniac. The veſſel is then heated, and ſmeared with a thin coating of pitch or reſin, to prevent the oxidizement of the ſurface. Then a piece of tin is rubbed all over the ſurface of the hot copper, which combines, and conveys to it a ſilvery whiteneſs. Adding more tin than actually combines with the ſurface of the copper, is of no uſe, becauſe the uncombined tin ſoon melts, and drops to the bottom of the veſſel; while from its projections it carries off the amalgam which defends the copper from the action of water, or acidulous liquors which oxidize the copper and convert it into a poiſon. The reaſon of ſcraping the ſurface, and rubbing with ſal-ammoniac, is to render the ſurface perfectly metallic. The ſal-ammoniac diſſolves any particles of oxide which the ſcraping may have left, while the coating of pitch or reſin prevents farther oxidizement. Metals do not combine with their oxides, any more than with earths; but metals combine with metals.

(1932.) Tin combines with iron, and by this proceſs what is called *tinplate*, or *white iron*, is formed. The iron being rolled into plates by what are called *ſlit mills*, are firſt ſcoured of ruſt by rubbing them with ſand. What oxide may ſtill remain upon their ſurface is then diſſolved by ſteeping them about 24 hours, in any weak vegetable acid, ſuch as may be procured from bran, or the refuſe of grains. The plates being now rubbed and dried, are dipped into liquid tin, at a high temperature. The tin not only adheres to the ſurface, but penetrates every pore of the iron. To prevent the tin from forming too thick a coat upon the ſurface of the iron, it is uſual to mix a very ſmall proportion of copper, about $\frac{1}{70}$th part with the tin.

(1933.) Though tin readily incorporates with iron, while the latter retains its ſolid form, they do not readily form an alloy by mutual fuſion. Bergman, who tried the experiment, obtained two alloys, the one compoſed of 21 parts of tin and one part of iron, the other compoſed of two parts of iron and one part of tin. The firſt, though harder than tin, was very malleable. The ſecond was harder and leſs malleable.

(1934.) But as iron bolts for ſhips are very apt to ruſt, eſpecially if they be covered with a copper ſheathing, and often a veſſel goes in pieces, while all her crew periſh from this unobſerved cauſe, we deem it a duty incumbent upon us to ſtate the ideas that have occurred to us upon this point. Our naval greatneſs, and even our national exiſtence, depend upon the ſafety of our ſeamen. We have learnt that attempts have been made to form ſhip-bolts by means of alloy, or mutual fuſion of the metals; with what ſucceſs we do not know. But the author of this article has long conceived that the only poſſible way to accompliſh this great object, is to proceed with the bolts in the ſame way as tinplate is formed. Firſt ſcour the bolts with ſand, then clean them by a weak acid, and laſtly dip them firſt in liquid pitch and then in liquid tin which contains a ſmall proportion of copper. The tin will penetrate every pore of the iron, and without diminiſhing its flexibility, or malleability, will effectually defend it from ruſt, or oxidizement. Thus ſuch bolts, formed in the way of incorporation in place of alloy, though they ſhould be dearer at firſt, may outlaſt the wood of many ſhips, and be found cheapeſt in the end. We are not ſure but the ſame hint may be applied to anchors, and to many other iron inſtruments neceſſary on board of ſhips.

(1934.) The order of the affinities of tin for metals is the following.

Tin.

Zinc,
Mercury,
Copper,
Antimony,
Gold,
Silver,
Lead,
Iron,
Mangneſe,
Nickel,
Arſenic,
Platina,
Biſmuth,
Cobalt.

(1935.) The oxide of tin combines with acids, and the following is the order of its affinities.

Oxide of Tin.

Tartaric acid,
Muriatic,
Sulphuric,
Oxalic,
Arſenic,
Phoſphoric,
Nitric,
Succinic,
Fluoric,
Saclactic,
Citric,
Lactic,
Acetic,
Boracic,
Pruſſic.

(1936.) The ſalts of tin are formed by the combination of the minimum or maximum oxides of tin with acids. When a ſalt is formed with the minimum oxide, if it be expoſed to the air it ſoon attracts oxygen, and the ſalt acquires the properties of thoſe whoſe oxide has acquired a maximum proportion of oxygen.

I. Sulphate *of* Tin.

(1937.) Sulphuric acid acts very ſlowly on tin when cold, but when aſſiſted by heat, the acid is decompoſed. Sulphurous acid gas eſcapes, and ſulphur is developed. The metal acquires its higheſt oxidation, and the ſalt formed is not cryſtallizable. But if the acid be made to act upon the minimum oxide of tin, or if it be poured into a ſolution of muriate of tin, a ſalt is formed which is ſoluble in water, and cryſtallizes either in fine needles, or in ſmall priſmatic cryſtals.

II. Sulphite *of* Tin.

(1938.) When a plate of tin is plunged into liquid ſulphurous acid, two compounds are formed. 1. A ſulphuret of tin, in the form of a black powder. 2. Sulphite of tin combined with a portion of ſulphur, which remains in ſolution. Theſe effects we muſt aſcribe to the decompoſition of the acid, and to the combination of the oxide thus formed with that part of the acid which eſcaped decompoſition.

III. Nitrate *of* Tin.

(1939.) Nitric acid acts with amazing violence upon tin, and with much increaſe of heat. The acid is decompoſed, and the tin is converted into an oxide, very little of which remains in ſolution in the acid. On attempting to concentrate the ſolution, the oxide wholly ſeparates. If the acid be diluted with water, and the veſſel in which the ſolution is performed be plunged in cold water to moderate the heat, part of the water as well as of the acid is decompoſed. The hydrogen of the water unites with the azote of the acid, and forms ammonia, which becomes ſenſible by its ſmell when potaſh is dropped into the ſolution. The oxides of tin do not form ſuch a permanent combination with nitric acid that the compound can be cryſtallized into a ſalt.

IV. Muriate of Tin.

(1940.) The muriatic acid acts upon tin when aſſiſted by heat. The water of the acid is decompoſed, the tin is oxidated and combines with the acid, while hydrogen gas eſcapes. This gas has a fetid ſmell when there is arſenic in the compoſition of the tin, which Prouſt has ſhewn to be owing to a portion of the arſenic that riſes along with the gas. The remaining arſenic is depoſited in the form of a black powder, and by adding the two portions together, the quantity of arſenic in the compoſition of tin may be aſcertained. Muriatic acid combines with both the oxides of tin, forming the *Muriate*, and the *Oxymuriate of Tin*.

(1941.) *Muriate of tin* is obtained by diſſolving tin in about four parts in weight of muriatic acid. By evaporation the ſolution yields needle-ſhaped cryſtals, which are ſomewhat deliqueſcent, and their ſpecific gravity is 2·2932. Water poured upon this ſalt precipitates a ſubmuriate, while there remains in ſolution muriate of tin with exceſs of acid. This ſalt attracts oxygen from the air, and from many bodies which contain it. Thus it abſorbs oxygen from the red oxide of mercury, the black oxide of manganeſe, the white oxide of antimony, and from the oxides of zinc and ſilver; all of which bodies are deprived of their oxygen, and reduced to their metallic ſtate by means of this ſalt.

(1942.) The *Oxymuriate of tin*, may eaſily be formed, according to Pelletier, by paſſing oxymuriatic gas through a ſolution of muriate of tin until it be ſaturated, and then expelling the ſuperfluous acid by heat.—But this compound has long been known under the name of the *ſmoking liquor of Libavius*, who diſcovered it in the tenth century. To prepare it, equal parts of amalgam of tin, and of oxymuriate of mercury are triturated together, and then diſtilled in a retort with a moderate heat. There firſt paſſes over ſome water, and then a denſe white vapour ruſhes into the receiver, which condenſes into a colourleſs liquid. It exhales a white ſmoke when expoſed to the air; but does not ſmoke in cloſe veſſels. This is oxymuriate of tin, and the ſmoke is ſuppoſed to be owing to the ſmall quantity of water it contains, in which ſtate it is very volatile. When placed in a jar over water, or in moiſt air, it abſorbs water, and forms ſmall cryſtals. If ſeven parts of water be mixed with 22 parts of this ſalt in its fuming ſtate, it becomes a ſolid maſs, which melts by heat like ice, and condenſes again when cooled. When melted it diſſolves more tin, and is converted into a common muriate.—Liquid oxymuriate of tin yields, by evaporation ſmall cryſtals, which ſublime by heat like the fuming ſalt. The cryſtals are deliqueſcent, and uſually contain an exceſs of acid.

(1943.) Oxymuriate of tin, commonly called *ſalt of tin*, is uſed in great quantities as a *mordant*, to fix and brighten the ſcarlet, and a variety of other dyes. For this purpoſe it is uſually prepared by diſſolving tin in the nitro-muriatic acid, to which the tin is added in ſmall portions until ſaturation takes place. But the compound formed by this proceſs is ſometimes merely a muriate, ſometimes an oxymuriate, and ſometimes a mixture of the muriate and oxymuriate of tin. Hence dyers often complain of not being able to ſtrike the ſame ſhade of colour in different circumſtances. It is thought all this uncertainty would be removed were the ſalt uniformly prepared by the proceſs recommended by Pelletier, above deſcribed.

(1944.) Tin is diſſolved, and its oxide forms ſalts with moſt of the other acids. But as the properties of theſe ſalts have not been much attended to, and they are not applied to any uſe, we deem a detailed deſcription of them unneceſſary.

(1945.) The oxide of tin, prepared by heat, with contact of air, and frequent ſtirring is called *tin putty*. It converts glaſs into a white opaque enamel. It is alſo uſed, on account of its hardneſs, for poliſhing cryſtal, ſpectacle glaſs, ſteel, the mirrors of teleſcopes, and other hard bodies.

(1946.) Tin filings, when mixed with hyperoxymuriate of potaſh, detonates by percuſſion, or by the application of a lighted match. It alſo deflagrates with nitre by the aſſiſtance of heat.

Sect. XIII. Lead.

(1947.) This metal was known at a very early period, and is frequently mentioned by Moſes.—Its ores are exceedingly various, and they are commonly found in veins interſecting the mica-ſchiſtic rocks. Sometimes, though rarely, they are found in ſandſtone, or limeſtone. The moſt common ore of lead is that which is called *galena*, or *glance lead*, from its ſhining appearance. It contains a portion of ſulphur, and is frequently cryſtallized in cubes. The other ores of lead are too numerous to be detailed. The galena, or ſulphuret of lead, is firſt roaſted to expel the ſulphur. It is then fuſed in an air-furnace, and run into moulds to conſolidate.

(1948.) This metal is of a bluiſh white colour, and very brilliant when newly melted or cut; but ſoon tarniſhes by expoſure to the air. It ſtains the fingers of a bluiſh colour, and is often uſed to draw lines upon paper. Taken internally, eſpecially in its combinations, it is a deadly poiſon, and ſeems to act chiefly on the nervous ſyſtem. Hence at Lead-hills they are at the greateſt pains to prevent cattle from drinking the water which iſſues from the lead mines, until it has run a ſufficient diſtance to depoſit is poiſonous contents. Its ſpecific gravity is 11·3523. What is ſingular reſpecting this metal, though it acquires more hardneſs and tenacity in conſequence of compreſſion, its ſpecific gravity is thereby diminiſhed, or its bulk is enlarged. It may be extended under the hammer into plates thinner than paper; but a lead wire of about $\frac{1}{12}$ inch diameter, only ſuſtains about 18 pounds.

(1949.) The ingenious Mr Crighton at Glaſgow aſcertained that lead melts at the temperature of 612°. At a very high heat, it boils and riſes in vapour. By ſlow cooling it cryſtallizes into quadrangular pyramids, or into 32 ſided polyhedrons.

Expoſed to the air, lead oxydizes and its ſurface acquires firſt a dirty grey colour, which afterwards approaches to white. The firſt cruſt of oxide which is formed, defends the remainder of the metal from the action of the air. The ſurface is more rapidly oxidized when expoſed to the joint action of air and water. But as the oxide thus formed is inſoluble in water, no detriment ſeems likely to enſue from uſing leaden pipes to convey water. But if any vegetable, or ſome of the vegetable acids, be preſent in the water, it is likely to be attended with the moſt deleterious effects. Hence pipes of caſt iron are now generally preferred for conveying water into towns.

(1950.) Lead is ſuppoſed capable of combining with at leaſt 4 proportions of oxygen, and of forming 4 oxides.

(1951.) The *yellow oxide of lead*, may be obtained by diſſolving lead in nitric acid, and then precipitating it by means of exceſs of carbonate of potaſh. A white powder falls, which when dried, and heated nearly to redneſs, aſſumes a yellow colour.—Or if lead be kept melted in an open veſſel, it ſoon aſſumes a grey cruſt. When this is removed another ſucceeds, until the whole is converted into this ſubſtance. If theſe cruſts be heated and agitated in an open veſſel, they aſſume the form of a greeniſh grey powder which is owing to a mixture of metallic lead among the yellow oxide. If the heat be continued much longer in an open veſſel, the whole is converted into the yellow oxide, which is known in commerce by the name of *maſſicot*, and is uſed as a paint.

(1952.) Lead, when firſt extracted from its ores, always contains a portion of ſilver which renders it harder, leſs flexible, leſs malleable and ductile than pure lead. When the proportion of ſilver is ſo great as to render it worth extracting, the lead is thrown from time to time into a large flat diſh, called a *teſt*, which is compoſed of burnt bones, fern-aſhes, and a minute mixture of clay beaten into an iron hoop, and the ſurface ſcooped out to a certain depth. The teſt is placed in a vaulted furnace, having a flame from coals playing over its ſurface. A bellows blows a ſtream of air acroſs the center of the teſt, and not only oxygenates the lead, but drives the oxide in a liquid ſtate, out at a ſpout on the oppoſite ſide of the furnace. This oxide is called *litharge*; it is partly of a grey, ſometimes of a red, but chiefly of a yellow colour. It is chiefly the yellow oxide of lead combined with various proportions of carbonic acid. When a great quantity of lead is thus converted into litharge, the ſilver remains and forms a broad cake at the bottom of the teſt. When litharge is again reduced into its metallic ſtate, by being mixed and heated with charcoal, it is then called *refined lead*, being lead in a ſtate of purity.

(1953.) The yellow oxide of lead is taſteleſs ſoluble in acids and in potaſh, but inſoluble in water. It melts into a hard brittle, ſemi tranſparent, yellow glaſs. Heated in the open air, its ſurface becomes brick red. It is ſuppoſed to contain

90·5 lead
9·5 oxygen

100

(1954.) What is called *white lead*, or *ceruſe* when mixed with chalk, is now aſcertained to be the yellow oxide of lead combined with carbonic acid. It is formed by ſuſpending plates of lead, rolled into a ſpiral form, in earthen pots covered with lids of lead perforated with holes, at the bottom of which there is a ſmall quantity of vinegar. The pots being placed in beds compoſed of the litter and dung of horſes, tanners bark, &c. well compreſſed, the heat occaſioned by the fermentation of the dung ſtraw, &c. raiſes the vinegar in vapour and cauſes it to oxygenate the lead.—White lead is uſed as a very durable point, and for a great variety of purpoſes. When mixed with oil, and newly laid upon wood, it is volatile and emits a gas or ſomething which has not been collected, but which is very deleterious.

(1955.) If *maſſicot*, or litharge, reduced to fine powder, be placed in a furnace where a ſtream of flame plays over its ſurface, ſo as to keep it at a cherry red heat and be conſtantly ſtirred by inſtruments introduced through lateral openings, which alſo admit air, in about 48 hours it is converted into a beautiful red powder, well known by the names of *minium*, or *red lead*. This powder is much uſed as a paint, and for various purpoſes. Heated to redneſs, it gives out oxygen gas, and melts into a hard dark brown glaſs. At the ſame time part is reduced to its metallic ſtate. According to Dr Thomſon, this oxide is compoſed of

88 lead
12 oxygen

100

(1956.) If the red oxide of lead be treated with nitric acid, of ſpecific gravity 1·260, part is diſſolved, and there remains a dark brown powder. Or if the red oxide have a ſtream of oxymuriatic acid gas directed through it in a veſſel partly filled with water, its colour becomes deeper and deeper until it is at laſt diſſolved. Potaſh precipitates from this ſolution the *dark brown oxide lead*, which is the peroxide, or lead ſaturated with oxygen. It is light and taſteleſs, and converts the muriatic into oxymuriatic acid. Heat expels 9 per cent of its oxygen, and converts it into yellow oxide. It is compoſed of about 80 lead
20 oxygen

100

(1957.) Heat readily converts all the oxides of lead into glaſs, and a portion of litharge or red lead is mixed in the finer ſpecies of glaſs, to render the materials more fuſible, and the glaſs leſs brittle. This property of the oxide of lead renders it extremely uſeful for ſeparating the baſer metals from gold, platinum, ſilver, and the more precious metals, which are not readily oxidized. Thus, to ſeparate copper or any baſer metal from gold or ſilver, a portion of lead is melted along with the alloy. The maſs is then placed upon a ſhallow cup compoſed of burnt bones, or the aſhes of wood, and heated under a muffle, or any other ſituation to which the air has acceſs. The lead oxidizes, and converts into an oxide the baſer metal, with which it forms a liquid glaſs, which runs down through the pores of the cup. After the proceſs is completed, the gold or ſilver remains in the form of a button on the bottom of the cup, and completely purged of every baſer metal with which it had been alloyed. This proceſs is called *cupellation*.

(1958.) Lead is not known to combine with any of the ſimple combuſtibles except with ſulphur and phoſphorus.—The ſulphuret of lead may be formed by ſtratifying and melting the materials together, or by dropping ſulphur into melted lead, until it be ſaturated. By this mode a combination is formed of the ſame colour; and every way reſembling *galena* deſcribed (1947.) It conſiſts of about 86 lead
14 ſulphur

100

(1959.) There alſo occurs, occaſionally, in lead mines, a brighter and more brilliant ſulphuret of lead which burns in the flame of a candle, and emits a blue flame when placed upon burning coals.—We alſo had occaſion to ſee in Caithneſs, and at Cantra in Nairnſhire, ſome ſpecimens of ſulphuret of lead, interſperſed in common galena, of a yellow colour and where there were cavities it ſometimes ſhot into pyramidal cryſtals which were not tarniſhed by the weather like the pyrites of iron. The veins in which theſe appearances occurred interſected coarſe puddingſtone, hard ſandſtone, or limeſtone, ſometimes arranged in alternate beds. This is *pyrites* of lead, and the two laſt ſulphurets have never been formed by art. They contain a greater proportion of ſulphur than the galena.

(1960.) Phoſphuret of lead may be formed by mixing and fuſing equal parts of lead, and of phoſphoric glaſs in a crucible, or by dropping phoſphorus into melted lead. This compound is of a bluiſh ſilver white colour, but ſoon tarniſhes. It cuts with a knife, but ſplits into plates when hammered. It conſiſts of about

88 lead
12 phoſphorus

100

(1961.) Lead combines with moſt of the metals.—With gold it forms a very brittle alloy, even when it is in the ſmalleſt proportion, ſo that the fumes of lead are ſufficient to deſtroy the ductility of gold. One part lead and 11 gold when combined by fuſion, form an alloy rather paler than gold, but as brittle as glaſs, its fracture of a pale brown colour, of a fine grain, without metallic luſtre, and reſembling that of porcelain. Mr Hatchet aſcertained that when lead combines with gold, their volume enlarges, or the ſpecific gravity of the compound is leſs than the medium of the two metals. The expanſion is increaſed when a portion of copper is mixed in the alloy; and he found the greateſt expanſion when 442 grains of gold
37·5 copper
0·25 lead
were mixed together, whoſe ſeparate bulks were equal to 1000. After mixture they expanded to 1057.

(1962.) Lead combines with platinum at a great heat, which diſſipates moſt of the lead in vapours. With ſilver it unites in almoſt any proportion, at a ſlightly red heat. The colour of this alloy approaches to that of lead, it is very brittle, according to Kraft the metals have their volume contracted in conſequence of uniting. The lead may be ſeparated from this alloy by cupellation.

(1963.) When mercury is rubbed among lead filings, or dropped into melted lead, it combines in any proportion. This amalgam is white and brilliant, and when compoſed of one part of lead, and one and a half of mercury, may be cryſtallized. With a great proportion of lead it becomes ſolid.

(1964.) Lead combines with copper when it is heated ſo as to boil and ſmoke, and pieces of copper are thrown into it. Their union is very ſlight for when the alloy is heated to the melting point of lead, moſt of the lead runs out, leaving the copper nearly pure. This alloy is uſed for making printers types of very large ſize.

(1965.) When lead and iron are fuſed together by a great heat, two alloys are formed, one at bottom conſiſting of lead with a ſmall proportion of iron, another at top conſiſting of iron with a ſmall proportion of lead.

(1966.) Lead combines with tin in all proportions, and the alloy is harder and more tenacious than tin. Muſchenbroeck aſcertained that the hardneſs is greateſt when one part of lead is added to three parts of tin. This alloy is the chief ingredient in *pewter veſſels*, and the increaſed hardneſs ſeems to prevent the dangerous effects of lead when food is dreſſed in ſuch veſſels. There are three kinds of pewter uſed—the *plate* for plates and diſhes, the *trifle* for pints and quarts, the *ley* for wine meaſures. Each of theſe contain a particular proportion of lead, as may be known from their ſpecific gravity, which increaſes with the lead. But 100 parts of tin and 17 antimony are ſaid to make the beſt pewter. Tin-foil always contains a portion of lead.—When the alloy conſiſts of two parts of lead and one of tin, it is more fuſible than either of the metals ſeparately, and is uſed by the plumbers as a ſolder.

(1967.) The order of the affinities of lead for the other metals, according to Bergman, is as follows.

Lead.

Gold,
Silver,
Copper,
Mercury,
Biſmuth,
Tin,
Antimony,
Platinum,
Arſenic,
Zinc,
Nickel,
Iron.

(1968.) The oxides of lead combine with acids, forming ſalts, which the alchymiſts diſtinguiſhed by the name of *Saturn*, but are now called *Salts of lead*. Theſe ſalts have not been much examined by chemiſts; but the yellow oxides ſeem chiefly to combine with acids, and the ſalts have a ſweet taſte, with ſome degree of aſtringency, and are not ſoluble in water unleſs the acid be in exceſs. The ſolution of theſe ſalts in water is limpid and tranſparent, which ſeldom happens with metallic ſalts.

(1969.) The order of the affinities of oxide of lead for acids, according to Bergman, is the following.

Oxide *of* Lead.

Sulphuric acid,
Saclactic,
Oxalic,
Arſenic,
Tartaric,
Muriatic,
Phoſphoric,
Sulphurous,
Suberic,
Nitric,
Fluoric,
Citric,
Lactic,
Acetic,
Boracic,
Pruſſic,
Carbonic.

I. Sulphate *of* Lead.

(1970.) Sulphuric acid does not act upon lead when cold, but when this acid is boiled upon lead, it is decompoſed. Sulphurous acid gas eſcapes, and the lead is converted into a white maſs, which is ſulphate of lead. It may be more readily obtained by pouring ſulphuric acid into a ſolution of acetate of lead, or by mixing this ſalt with any of the alkaline ſulphates. The ſulphate of lead goes down in the form of a taſteleſs white powder, whoſe ſpecific gravity is 1·8742. According to Kirwan it is only ſoluble in 1200 parts of water; but when the acid is in exceſs, it is more ſoluble, and yields by evaporation ſmall white cryſtals in the form of tetrahedral priſms. Sulphate of lead is found native in Perry's mountain Angleſey cryſtallized in four-ſided pyramids; and at Leadhills in Scotland in tranſparent tables. When laid upon burning coals the lead is quickly reduced, and according to Kirwan 100 parts of the ſalt yield 71 parts of pure lead.

(1971.) The conſtituents of this ſalt are, according to

	Kirwan,	*Bucholz,*	*Klaproth.*
Sulphuric acid	23·37	24·72	26·5
Yellow oxide of lead	75·00	75·28	73·5
Water - -	1·63		
	100	100	100

II. SULXHITE *of* LEAD.

(1972.) The ſulphurous acid only combines with the yellow oxide of lead, with which it forms a ſalt in the form of white powder, taſteleſs, and inſoluble in water. It is decompoſed by a red heat, and there remains a mixture of the ſulphate and ſulphuret of lead. Perhaps this ſalt might be uſed as a paint, in place of white lead. According to Dr Thomſon, its conſtituents are

74·5	oxide of lead
25·5	ſulphurous acid.
100	

III. NITRATE *of* LEAD.

(1973.) The nitric acid, when not too much concentrated, acts violently on lead, firſt converting it into a white powder, and then diſſolving it with the aſſiſtance of heat. The nitric acid combines only with the protoxide, and the yellow oxide of lead, from which there reſults two ſalts, which are diſtinguiſhed by the names of *nitrate* and *oxynitrate* of lead.

(1974.) The *oxynitrate* of *lead* is formed when nitric acid is boiled upon lead which is not in exceſs, or when white lead is diſſolved in this acid. The ſolution of this ſalt is limpid and colourleſs, and after evaporation it yields by ſlow cooling ſix-ſided pyramidal cryſtals, which have a ſilvery luſtre. They are not altered by the air, have a ſweetiſh though harſh taſte, their ſpecific gravity being 4·068. They are ſoluble in 7·6 parts of boiling water. When heated they part with their water, and detonate feebly with brilliant ſparks. Rubbed with ſulphur in a hot mortar, they alſo detonate ſlightly, and the lead recovers its metallic ſtate. Their conſtituents according to Dr Thomſon, are

66	yellow oxide
34	acid and water.
100	

(1975.) The *Nitrate of Lead* is formed by boiling lead in a ſolution of the preceding ſalt, or by boiling nitric acid upon more lead than it can diſſolve. In this caſe the additional lead abſorbs the exceſs of oxygen, and there is only a protoxide left with which the acid can combine. The ſolution is yellow and it yields yellow cryſtals in ſmall ſcales or priſms, which are ſoluble in water. They have the ſame ſweet and aſtringent taſte with the former ſalt. Their conſtituents, according to Dr Thomſon, are

81·5	oxide
18·5	acid
100	

(1976.) When nitric acid is poured upon the red oxide of lead, about $\frac{6}{7}$ths of it are diſſolved, being previouſly changed into the ſtate of white or yellow oxide. The ſuperfluous oxygen combines with the remaining ſeventh, and converts it into a dark brown inſoluble powder, which is the peroxide of lead. This illuſtrates what was already ſtated that nitric acid only combines with the two firſt oxides of lead; namely the white and the yellow.

MURIATE *of* LEAD.

(1977.) Muriatic acid only acts feebly on lead when aſſiſted by heat, but it readily combines with the yellow oxide. When poured upon the red oxide, and aſſiſted by heat, it is partly converted into oxymuriatic acid, while the oxide is changed into white oxide, and combines with the remainder of the acid.

(1978) The *muriate of lead* is moſt readily formed by pouring an alkaline muriate, common ſalt for example, or muriatic acid into a ſolution of nitrate of lead. The muriate of lead falls in the ſtate of a white powder, of a ſweetiſh taſte. Its ſpecific gravity is 1·8226; is ſoluble in 22 parts of cold water, and its ſolubility increaſes in proportion to the exceſs of its own acid, or by the preſence of any other acid. It is diſtinguiſhed from ſulphate of lead by being ſoluble in acetic acid. It cryſtallizes by cooling in ſmall white ſix-ſided priſms reſembling ſattin, which are not changed by the air. Theſe cryſtals melt by heat, and when cooled form a ſemitranſparent greyiſh-white maſs, formerly called *blunibum corneum.* In a ſtrong heat they partly evaporate in white ſmoke, and there remains a ſubmuriate of lead. The conſtituents of this ſalt are, according to

		Kirwan.	
	Klaproth.	Cryſtals.	Dried.
Muriatic acid	13·5	18·23	17
Oxide ·	86·5	81·77	83
	100	100	100

(1979.) The *Submuriate of Lead* may be obtained by abſorbing a portion of its acid from the preceding ſalt by means of a pure alkali. But it is commonly obtained by decompoſing common ſalt diſſolved in water, by triturating among it four times its weight of litharge reduced to fine powder. The late Mr Samuel Birnie eſtabliſhed a manufactory of this ſort at Leith, by which he decompoſed common ſalt and obtained ſoda. Warm water being added to waſh off the ſoda, the ſubmuriate of lead remains in the form of an inſoluble powder, of a white colour. After being calcined and melted, this ſalt aſſumes a very beautiful yellow colour, and is uſed as a very elegant and durable paint for various purpoſes.

V. Hyperoxymuriate of Lead.

(1980.) Mr Prouſt firſt formed this ſalt by directing a ſtream of oxymuriatic acid gas through a Wolfes' bottle, which contained red lead and water. The red oxide continued to abſorb more oxygen until it acquired a brown colour, and was oxygenized to a maximum. A portion of it was then gradually diſſolved, and hyperoxymuriate of lead formed. This ſalt is much more ſoluble than muriate of lead, and it is eaſily decompoſed.

VI. Fluate of lead.
VII. Borate of lead.
VIII. Phosphate of lead.

(1981.) The phoſphoric acid acts very ſlowly on lead; but if an alkaline phoſphate be mixed with nitrate of lead, the phoſphate of lead precipitates in the form of a white inſoluble powder. This ſalt occurs native in various parts of the world and is one of the ores of lead. It is decompoſed by charcoal in a red heat, which abſorbs the oxygen from both of its component parts. Dr Thomſon found a yellow phoſphate of lead from Lead hills to contain

18	acid
81	yellow oxide
100	

IX. Carbonate of Lead.

(1982.) This conſiſts of carbonic acid combined with the yellow oxide of lead. It is abſolutely inſoluble in water, and the way of preparing it for making paint was deſcribed (1954.) It may alſo be formed by precipitating the oxide of lead from ſolution in nitric acid by the alkaline carbonates. A white powder falls, which is the carbonate of lead. It is ſoluble in pure potaſh.—It abounds native, and is one of the ores of lead. Its conſtituents are, according to

	Chenevix,	*Bergman,*	*Prouſt,*	*Klaproth,*
Carbonic acid	15	16	16·15	16·33
Yellow oxide	85	84	83·85	83·67
	100	100	100	100

X. Arseniate of lead.
XI. Tungstate of lead.
XII. Molybdate of lead.
XIII. Chromate of lead.
XIV. Acetate of lead.

(1983.) The acetic acid does not attack lead unleſs it be aſſiſted by the air in open veſſels. But when it is thus aſſiſted, it firſt oxidizes the lead, and then diſſolves the oxide. It readily diſſolves the yellow oxide, and the carbonate of lead, forming with them two ſalts, one of which has an exceſs of acid, the other is neutral.

(1984.) The *Superacetate of lead* has long been known under the various names of *ſalt of ſaturn*, *ſugar of ſaturn*, *ſalt of lead*, *ſugar of lead*, &c. It is formed by diſſolving oxide of lead in vinegar of wine or beer, which is previouſly diſtilled to free it of impurities. The vinegar is put into earthen veſſels, and ſometimes metallic lead, in thin plates, ſometimes litharge in fine powder, ſometimes carbonate of lead, or white lead, are ſubjected to its action. When metallic lead is uſed, there are two ſets of plates, one of which is drawn up to the ſurface, that they may be oxygenated by the joint action of the air and acid. Being ſuſpended, they are then let down to the bottom, that the oxide formed at the ſurface may be diſſolved in the acid, and the other ſet is drawn up; and thus their poſition is changed alternately each day, until the acid be ſaturated.

(1985.) Others employ litharge, or *white lead*, which more readily form the ſalt. As *white lead*, or *carbonate of lead*, abounds in nature, and forms one of the ores of this metal, it ſeems ſtrange they never thought of employing the natural, which would prove much cheaper than the artificial carbonate, or any artificial oxide.

(1986.) The vinegar having diſſolved a ſufficient quantity of the oxide of lead, the liquor is filtered, and evaporated in copper boilers, in which are interſperſed a few bars of lead to prevent the acid from attacking the copper. When ſufficiently concentrated, it is let out into wooden coolers, where it depoſits ſmall cryſtals, which are flat four-ſided priſms, terminated by dihedral ſummits, which are white, and of a gloſſy appearance like ſatin. The *mother water*, or what does not cryſtallize, is drawn off by inclining the veſſel, or by opening a plug at its bottom, and is returned to the boiler. The taſte of theſe cryſtals is ſweet, and ſomewhat aſtringent; their ſpecific gravity is 2·345. Water boiled upon this ſalt diſſolves 29 *per cent*, and after it cools, retains in ſolution 27 *per cent* of its weight of it. When diſſolved in water, or when we blow through a ſolution of this ſalt, a white powder falls. This is carbonate of lead, formed, in the firſt caſe by carbonic acid in the water, in the ſecond from the lungs.

(1987.) This ſalt is decompoſed by all thoſe acids and their compounds which form with oxide of lead a compound nearly inſoluble in water, ſuch as the ſulphuric, phoſphoric, muriatic, fluoric, oxalic, malic, &c. It is for this reaſon that acetate, or ſugar of lead is of ſuch univerſal uſe to the dyer and calico printer, for producing the acetates of alumina, of iron, &c. &c. by double affinity. They mix ſolutions of this ſalt with thoſe of alum, or of green vitriol. The ſulphuric acid in the latter ſalts ſeizes the oxide of lead, and goes to the bottom in the ſtate of an inſoluble compound, while the acetic acid combines with the alumina, or with the iron, and remains in ſolution. The acetates of alumina and of iron, thus formed, are found to be much better mordants for fixing colours, than alum or green vitriol, which are apt to corrode and deſtroy cloths. They are alſo much eaſier decompoſed, ſo as to depoſit their baſes upon the cloth, in union with the colouring matter.—In treating of acetate of lime and alumina, and in (119) we pointed out a way by which the ſame effect might be produced by means of *acetate of lime*, or of *barytes*, the firſt of which, at leaſt, may be procured at a much cheaper rate than acetate of lead.

(1988.) Prouſt obſerved that when 160 parts of ſugar of lead are diſtilled, there firſt comes over

12 parts of acidulous water. On raiſing the heat, 72 parts of a yellow liquid, reſembling alcohol, though mixed with an empyreumatic ſmell. Lime diſengages ammonia from this liquid, where it is combined with a ſlight exceſs of acid. The liquid being ſaturated with potaſh, in 24 hours one third part of oil ſeparated and floated on its ſurface. The oil being drawn off by a ſyphon, and the remaining diſtilled by a low heat, the firſt eight parts which came over were of ſpecific gravity 0·88, and mixed with water like alcohol. Its volatility was not much inferior to ether, and it burnt with a large white flame when brought near a lighted candle. Abundance of carbonic acid gas eſcaped during the diſtillation, but no ſenſible quantity of any other elaſtic fluid.

(1989.) The conſtituents of ſuperacetate of lead are

26	acid
58	yellow oxide
16	water
100	

(1990. The *acetate of lead* contains a ſmaller proportion of acid than the preceding ſalt, and it may be formed by boiling in water 100 parts of ſugar of lead, and 150 parts of dry litharge, which had been previouſly deprived of its carbonic acid. It is leſs ſoluble in water, its taſte leſs ſweet, and it cryſtallizes in plates. Its conſtituents, according to Thenard, are

17	acid
78	oxide
5	water
100	

(1991.) *Goulard's extracts*, or *vinegar of lead*, which is much uſed in caſes of external inflammation, is the ſame with acetate of lead. It was prepared by boiling diſtilled vinegar on lead until it refuſed to diſſolve any more of the oxide. It is precipitated in much greater proportion by carbonic acid than the ſuperacetate, and is a much more delicate teſt for mucilage or gum. It derives its name from Goulard, a ſurgeon in Montpellier.—But ſugar of lead, from its not being ſo eaſily precipitated, and being more ſoluble, is eſteemed a much better waſh for gonorhea and other venereal ſores, than Goulard's extract.

(1992.) The other ſalts of lead, not being applied to any uſe, it is not thought neceſſary to enter into any deſcription of them.

(1993.) The alkalies and alkaline earths unite readily with oxide of lead. If lime water be digeſted upon litharge, part of it is diſſolved, and by evaporation the ſolution yields ſmall, tranſparent irrideſcent cryſtals, not more ſoluble than lime. The ſolution of this compound blackens wool, the nails, hair, and white of an egg; but does not alter ſilk, the ſkin, or yolk of an egg. It has ſometimes been employed in blackening the hair.—The oxides of lead are not only employed in the proportion of from ⅕th to ⅙th in the compoſition of glaſs, but they are alſo employed in glazing various kinds of pottery and ſtone ware. But common ſalt and vinegar ſhould not be kept in veſſels glazed with lead, as their acids are apt to combine with part of the oxide, which renders them poiſonous.

SECT. XIV. ZINC.

(1994.) It does not appear that the ancients were acquainted with zinc as a ſeparate metal. The Greeks, indeed knew a mineral to which they gave the name of *Cadmia*, becauſe the knowledge of it had firſt been brought into Greece by Cadmus, which, when fuſed with copper, formed braſs; and that it was volatilized by heat into a ſpongy maſs which they uſed in medicine. It was firſt mentioned by Albertus Magnus who died in 1280, though from his calling it *marcaſite of gold*, it is not certain if he ever had ſeen it. Paracelcus, who died in 1541, is the firſt perſon who mentioned the word *zinc*. This metal is alſo very commonly known under the name of *ſpelter*.

(1995.) The ores of zinc are very numerous and abundant. They chiefly occur in the oldeſt of the ſecondary rocks, and ſometimes in the primary rocks. They may all be reduced to the following. 1. The ſulphurets, which are of three ſpecies, the *black*, *yellow*, and *brown*. The black is the moſt common, and is known by the name of *blende* or *black jack*. It is often cryſtallized in tetrahedrons and octahedrons, and frequently occurs in lead mines. In this ore, beſide ſulphur a variety of other metals and earths frequently occur, ſuch as iron, lead, arſenic, copper, ſilica, alumina &c. 2. Oxides, which are of a whitiſh colour, and have obtained the name of calamine, or *lapis calaminaris*. This ore always contains ſilica and is frequently cryſtallized in minute octahedrons. 3. Carbonates, which have alſo obtained the name of calamine. They are of a browniſh or yellowiſh white colour. 4. Sulphates of zinc, which being ſoluble in water, belong more properly to mineral water.

(1996.) There are three works in this country, two near Briſtol, and one near Swanſey, where zinc is reduced from its ore. The ore operated upon is ſulphuret of zinc, which being roaſted, and reduced to powder, is mixed with charcoal and heated in large cloſed clay pots. The zinc when reduced drops through an iron tube inſerted in the bottom of the pot, into a veſſel filled with water. It is afterwards fuſed, caſt into ingots, and a conſiderable quantity is annually exported, chiefly to the north of Europe.

(1997.) This metal is compoſed of a number of thin adhering plates, and is of a brilliant white colour with a tendency to blue. When rubbed it tinges the fingers black, and leaves upon them a peculiar taſte and ſmell. After being melted, its ſpecific gravity varies from 6·861, to 7·1, the lighteſt being eſteemed the pureſt. It may be hammered ſo as to become 7·1908.

(1998.) It is leſs malleable than any of the preceding metals, yet flattens under the hammer, and by cautious preſſure may be reduced into thin plates, which are flexible and elaſtic, but cannot be folded without breaking. It may be hammered at pleaſure, and even rolled into very thin plates, when it is heated ſomewhat above 212°. It becomes ſo brittle that it may be reduced to powder in a mortar when heated to about 400°. With caution it may be drawn into a wire, and its tenacity

city is ſuch that a wire $\frac{1}{10}$th of an inch diameter ſupports a weight of 26lbs. It melts at about 680°, and with a higher heat it evaporates, and may be diſtilled in cloſe veſſels. When ſlowly cooled it cryſtallizes in ſmall bundles of quadrangular priſms, croſſing each other in every direction.

(1999.) Expoſed to the air its ſurface becomes tarniſhed. It ſlowly decompoſes water, hydrogen gas is emitted, and oxygen combines with the metal, which conveys to its ſurface a black colour. Heat accelerates the decompoſition of the water, and if its ſteam be conveyed through a tube containing zinc at a high temperature, the water is decompoſed with great rapidity.

(2000.) There are two oxides of zinc, the *protoxide*, and the *peroxide*.—The peroxide is formed ſeveral ways. When zinc is kept melted in an open veſſel, its ſurface is covered with a grey coloured cruſt, which being removed another ſucceeds, and thus the whole zinc may be oxidized, by combining with the oxygen of the atmoſphere. If theſe cruſts be heated and ſtirred in an open veſſel, they are converted into a grey powder, with a ſhade of yellow, which is called the *grey oxide of zinc*. In fact they are a mixture of the white and yellow oxides. But if zinc be highly heated in an open veſſel, it takes fire, and burns with a brilliant white flame. At the ſame time it emits a vaſt quantity of white flakes, which have been long known by the names of *philoſophic wool*, and *flowers of zinc*.—Theſe flakes are the peroxide of zinc, and according to Mr Prouſt contain

80 parts zinc
20 oxygen
———
100

This peroxide of zinc has often been propoſed as a paint, for which it would anſwer extremely well, were it perfectly white, and not contaminated by any mixture of the yellow oxide.

(2001.) The yellow or protoxide is formed by heating the white or peroxide ſtrongly in an earthen retort, or covered crucible, by which part of its oxygen is ſeparated, and it aſſumes a yellow colour. This oxide is compoſed of

88 parts zinc
12 oxygen
———
100

To reduce the oxides of zinc into the metallic form, they muſt be mixed with charcoal, and ſtrongly heated in veſſels from which external air is excluded. Otherwiſe this metal has ſo ſtrong an attraction for oxygen, that it will abſorb it from the air as faſt as it is deprived of it by the action of charcoal. Not attending to this ſeems to be the reaſon why mankind were ſo long in obtaining zinc in its metallic form.

(2002.) When zinc is employed to procure hydrogen gas, by ſolution in diluted ſulphuric acid, particles of the zinc riſe along with the gas, and are afterwards depoſited on the ſides of the jar. It has hence been inferred that this gas diſſolves zinc; but there is no appearance of chemical ſolution, any more than of duſt that is carried through the air.

(2003.) Pelletier combined phoſphorus with zinc, by dropping bits of phoſphorus into it while liquid, adding alſo ſome reſin to ſpread upon its ſurface and prevent its oxidizement. When zinc is kept in fuſion workmen cover its ſurface with a coat of reſin, to prevent its combination with atmoſpheric oxygen.—Phoſphuret of zinc is white, of metallic ſplendor, and in a ſtrong heat burns like zinc.

(2004.) Phoſphorus alſo combines with the oxide of zinc. When 12 parts of oxide of zinc, 12 of phoſphoric glaſs, and 2 of powdered charcoal, are mixed and diſtilled from an earthen retort, with a ſtrong heat, a ſilver white ſubſtance comes over, which has a vitreous fracture, and according to Pelletier is phoſphureted oxide of zinc.

(2005.) Sulphur is not known to combine artificially with zinc, but the brown ore called *blende* is ſuppoſed, on apparently good grounds, to be a natural combination of ſulphur with zinc; or a phoſphuret of zinc in which the zinc is in its metallic ſtate.

(2006.) Zinc combines with almoſt all the metals, and ſome of its alloys are of great importance in the arts.—With gold it forms a hard brittle alloy, and even the fumes of zinc near melted gold render it brittle. Mr Hellot found that equal parts of gold and zinc make a very hard and white alloy, which takes a fine poliſh and does not readily tarniſh. He therefore recommends it for the ſpecula of teleſcopes. Mr Hatchett found that 11 parts gold and one zinc, formed an alloy reſembling braſs. When gold and zinc combine, their ſeparate bulks are ſomewhat diminiſhed.

(2007.) Dr Lewis found that the fumes of zinc unite with platinum, ſo as to increaſe its weight one third. The alloy is bluiſh white, hard and brittle.

(2008.) Zinc readily unites with ſilver, the alloy is brittle, of a granular texture, and of a bluiſh white colour. The bulk of the metals is diminiſhed. If an alloy of 11 parts zinc and one ſilver, be ſublimed in open veſſels, the ſilver riſes along with the zinc.

(2009.) Zinc amalgamates with mercury, and they unite the more readily when mercury is poured upon zinc heated ſo as to ſinge paper, but not inflame it. The conſiſtence of the amalgam varies with the proportion of zinc. Eight parts zinc, and one mercury form a white and brittle compound. One zinc, and 2½ mercury, being melted and ſlowly cooled cryſtallizes.—This amalgam is much uſed to produce excitement in electrical machines.

(2010.) The combination of zinc with copper is one of the moſt uſeful of all the metallic alloys. This alloy has obtained the name of *braſs*. It is commonly formed by mixing granulated copper, the native oxide of zinc called *calamine*, and a proportion of charcoal powder, and ſubjecting them to heat during five or ſix hours. The charcoal abſorbs the oxygen from the calamine, and the zinc combines with the copper by cementation. The heat is then raiſed ſo as to melt the whole maſs, and it is poured into moulds of granite hooped with iron, and caſt into ingots or plates. We have known braziers make very beautiful braſs by ſtratifying plates of copper with certain proportions of metallic zinc alternately in a large covered crucible, and ſubjecting them to a low heat until the zinc had combined by cementation. The heat being now raiſed ſo as to melt the whole, the braſs was poured into moulds. Dr Lewis aſcertained that a very ſmall proportion of zinc renders copper pale, and that it inclines to yellow when it has combined with one twelfth of its weight of zinc. When the weights of the two metals are equal, the yellowneſs is greateſt. Beyond this if zinc continue to be added, the alloy becomes paler, and at laſt white. The proportions of zinc and copper are varied according to the purpoſes to which the braſs is to be applied. The medium in Britiſh manufactories is about $\frac{1}{3}$d weight of zinc, to about $\frac{2}{3}$ds weight of copper. In Germany and Sweden the proportion varies from $\frac{1}{3}$th to $\frac{1}{4}$th of zinc to the copper. Braſs is much more fuſible than copper, and malleable when cold, unleſs the zinc be in exceſs, but is brittle when heated. It may be drawn into very fine wire, and its tenacity is much greater than that of copper. It may be turned upon the lath, and works more kindly than other metals. It is not ſo apt to oxygenate as copper.

(2011.) What is called *pinchbeck*, *prince's metal*, *prince Rupert's metal*, &c. is made by combining metallic zinc with copper. It always contains much more zinc than braſs, but the proportion is various, and pinchbeck ſometimes conſiſts of equal weights of zinc and copper. The colour of this alloy approaches that of gold; but it is brittle, and much leſs malleable or tenacious than braſs.—When braſs is ſubjected to exceſſive heat in an open crucible, the zinc is ſublimed, and the copper left in a ſtate of purity. Malouin has ſhewn that zinc may be advantageouſly employed for coating the ſurface of copper veſſels. That it ſpreads more equally, and is not ſo apt to melt as tin.

(2012.) The heat neceſſary to melt iron, diſſipates zinc before a combination is formed. But Dr Lewis, who effected the alloy of zinc with iron, found it ſomewhat malleable, though hard, and of a whiteneſs approaching to ſilver. Could this alloy be eaſily effected, it is likely to be of great uſe in the fabrication of many utenſils, and it may be probably effected by cementation, that is bringing the fumes of zinc to act upon clean iron. Malouin ſhewed that zinc might be uſed in place of tin to cover iron plates, a proof of the affinity of theſe metals.

(2013.) Zinc combines with tin, and this alloy is ſtill ductile, though harder than zinc, and more tenacious than tin. This alloy is ſaid to make a principal ingredient in *pewter*.

(2014.) Zinc combines with lead, when they are put into a covered crucible to prevent evaporation, with ſome ſuet to prevent oxidation. In proportion as the weight of zinc exceeds that of the lead, the alloy is hard, though ſtill malleable. Two parts zinc, and one lead, form a hard though ductile alloy. As the proportion of lead exceeds that of zinc, the alloy approaches to the appearance of lead, though harder and more ſonorous.

(2015.) Zinc does not appear capable of combining with nickel; though Engeſtraem aſſures us that the *pak-fong*, or white copper of the Chineſe, is a compound of copper, nickel and zinc. It is poſſible they may find theſe metals combined in the ore from which their white copper is extracted

(2016.) The affinities of zinc for the other metals are in the following order.

ZINC.

Copper,
Antimony,
Tin,
Mercury,
Silver,
Gold,
Cobalt,
Arſenic,
Platinum,
Biſmuth,
Lead,
Iron,
Nickel.

(2017.) The oxides of zinc combines with acids, forming ſalts, which are diſtinguiſhed by the name of *ſalts of zinc*, a few of the moſt uſeful of which may deſerve conſideration. The order of the affinity of the oxide of zinc for acids follows.

OXIDE OF ZINC.

Oxalic acid,
Sulphuric,
Muriatic,
Saclactic,
Nitric,
Tartaric,
Phoſphoric,
Citric,
Succinic,
Fluoric,
Arſenic,
Lactic,
Acetic,
Boracic,
Pruſſic,
Carbonic.

I. SULPHATE *of* ZINC.

(2018.) Diluted ſulphuric acid acts with great violence upon zinc. Water is decompoſed and converts the zinc into an oxide which diſſolves in the acid, while a great quantity of hydrogen gas eſcapes with effervescence. When the ſolution is ſufficiently evaporated, it yields cryſtals of ſulphate of zinc by ſlow cooling.

(2019.) The *white vitriol* of commerce is ſulphate of zinc, and it is formed by roaſting ſulphuret of zinc or the ore called blende, with exceſs of air. This converts the ſulphur into acid, which uniting with the oxide of zinc in the ore, forms this ſalt. The ſalt being waſhed off by water, is evaporated until it forms ſmall cryſtals, and it is made up into maſſes like ſugar loaves. But it is often contaminated with the ſulphates of iron, or with copper and lead, and hence the complaints of ſurgeons who uſe this ſalt in medicine. To obtain it pure it ſhould be diſſolved in water, and have zinc added to it, with occaſional ſtirring. The zinc precipitates all the other metals, and takes their place. The ſolution ſhould then be filtered, and evaporated, and the pure ſalt will be obtained in cryſtals. Its cryſtals are tetrahedral priſms, terminated by four-ſided pyramids. Their ſpecific gravity is 1·912. At 60° they are ſoluble in 2·28 parts of water; but are much more ſoluble in boiling water. Heated they melt, and loſe their water, and at a high heat part of their acid. Heated with charcoal the zinc is reduced, riſes in vapour, and inflames. This ſalt is much uſed by dyers to deepen the colours produced by madder, cochineal, and other ſubſtances. A white oxide is precipitated from it by all the alkalies, and when the carbonated alkalies are uſed, the precipitate is carbonate of zinc, which forms a white paint. The alkaline ſulphurets, and hydroſulphurets, precipitate the oxide of a deep orange or brown colour.

(2020.) The component parts of this ſalt are, according to

	Bergman,	*Kirwan,*	*Smithſon, dried ſalt.*
Sulphuric acid	40	20·5	50
Oxide of zinc	20	40·0	50
Water - -	40	39·5	
	100	100	100

(2021.) The ſalt we have been treating of always contains the acid in exceſs; but another variety ſometimes occurs in which the acid is neutralized. The cryſtals of this laſt are rhomboids approaching to cubes. It is perfectly tranſparent, and reſembles flint glaſs in appearance. Perhaps the variations in the above analyſis may have ariſen from confounding theſe two together.

II. Sulphite *of* Zinc.

(2022.) Sulphurous acid acts violently on zinc, with a mutual decompoſition of water and the acid. Heat is generated, and ſulphureted hydrogen gas eſcapes. The water oxidizes the zinc, and its hydrogen combining with part of the ſulphur extricated by the decompoſition of the acid, forms the ſulphureted hydrogen gas. The remaining ſulphur combines with the ſulphite of zinc as it forms.

(2023.) Thus *ſulphureted ſulphite of zinc* is produced. The taſte of the ſolution is acrid, aſtringent, and ſulphureous. Expoſed to the air it becomes thick like honey, and depoſits long four-ſided priſms, terminated by four-ſided pyramids. Theſe cryſtals are ſoluble in water and in alcohol, become white by expoſure to the air, and depoſit a white inſoluble powder. It ſwells before the blow-pipe, emits light, and ſhoots into ramifications. Diſtilled it yields water, ſulphurous acid, ſulphuric acid, ſulphur; while oxide and a little ſulphate of zinc remain behind. Several acids expel the ſulphurous acid from this ſalt, and precipitate ſulphur.

(2024.) *Sulphite of zinc* is formed when the ſulphurous acid combines with the oxide of zinc, when heat is produced, but no efferveſcence. The ſolution yields cryſtals which are leſs ſoluble in water than the former, but they are inſoluble in alcohol. By expoſure to the air they ſoon change into ſulphate of zinc.

III. Nitrate *of* Zinc.

(2025.) Strong nitric acid acts with great violence on zinc, and ſometimes ſets it on fire. Even when the acid is conſiderably diluted much heat is produced, and a violent efferveſcence by the eſcape of nitr-oxide gas. The ſolution yields flat ſtriated tetrahedral priſms, terminated by four-ſided pyramids. Their ſpecific gravity is 2·096. They deliqueſce, and are ſoluble both in water and alcohol. They melt by heat, and detonate with a red flame when thrown upon burning coals. They emit red vapours of nitrous acid when diſtilled, and aſſume a gelatinous form. In a ſtrong heat they emit nitrous gas, and oxygen gas, and are completely decompoſed.

IV. Muriate *of* Zinc.

(2026.) When muriatic acid acts upon zinc, water is decompoſed, and much hydrogen gas eſcapes with efferveſcence. The acid diſſolves the oxide formed, and the ſolution is colourleſs. It does not cryſtallize, but forms a jelly when evaporated. Diſtilled, ſome acid comes over, and the muriate of zinc remains in a ſolid maſs, which was formerly called *butter of zinc*. This is eaſily fuſible, and with a ſtronger heat ſublimes, and concretes into a fine white coloured maſs, compoſed of ſmall needles. Its ſpecific gravity is 1·577. It is very ſoluble in water, and becomes gelatinous when expoſed to the air. The ſulphuric acid decompoſes it, and the alkalies precipitate the oxide of zinc of a pure white colour. Some of theſe precipitates are uſed as paints, particularly to whiten the ſkin.

(2027.) A triple ſalt is formed by the combination of oxide of zinc with muriate of ammonia. The only other ſalt of zinc which ſeems deſerving of particular notice is

V. Acetate *of* Zinc.

(2028.) The acetic acid readily diſſolves zinc, and the ſolution yields cryſtals in the form of rhomboidal or hexagonal plates, which have the appearance of talk. The ſalt has a bitter metallic taſte, is ſoluble in water, but is not altered by the air. It burns on live coals with a blue flame. Diſtilled, it yields water, an inflammable liquid, ſome oil, and oxide of zinc at laſt ſublimes.

(2029.) All the ſalts of zinc, excepting perhaps thoſe which are compounded of the arſenic and other metallic acids, are reckoned not only ſafe, but in ſome caſes ſalutary, when taken internally, or uſed in external applications. The ſulphate, of which nature furniſhes the materials in great abundance, has long been uſed in medicine for various purpoſes. The ingenious Mr Henry of Mancheſter, to whom chemiſtry and the arts are under the higheſt obligations, and who is not more diſtinguiſhed by the ardour and ſucceſs with which he was proſecuted theſe objects, than by the reſpectability of his profeſſional character, recommends acetate of zinc as an excellent application in caſes of inflammation.

(2030.) The volatility of zinc, and its oxides, ſeems to be the reaſon why the latter have not been employed in colouring glaſs, or in forming enamels. Zinc has ſo ſtrong an attraction for oxygen, that a plate of it, when dipped into almoſt any ſolution of metals in acids, abſorbs the oxygen from their oxides, and precipitates the metal in its metallic ſtate. In caſes where the metal is precipitated in the ſtate of an oxide, it is always deprived of a part of its oxygen, and the reaſon why it is not wholly reduced to the metallic ſtate, ſeems to be, that it contains more oxygen than is neceſſary to oxidize the zinc, and prepare it to combine with the acid. This ſtrong attraction of zinc for oxygen is the reaſon why it produces ſuch a brilliant inflammation when thrown into the nitrates heated to redneſs. A violent detonation often enſues. Three parts of well dried nitre, and one of powdered zinc, being thrown into a red hot crucible, produce a moſt brilliant inflammation. The inflamed matter is often thrown to a conſiderable diſtance, ſo that the experiment ſhould be made with caution. This compoſition is often uſed in fire works.

II. Brittle and easily fused Metals.

Sect. XV. Bismuth.

(2031.) Biſmuth does not ſeem to have been known to the ancients. The firſt perſon who deſcribes it as a peculiar metal is Agricola, about the year 1529. Beccher was the firſt who pointed out ſome of its diſtinguiſhing properties. Pott added many important facts in his diſſertation publiſhed in 1739. He was followed by Newman, Hellot, and Dufay; but Geoffroy, junior, firſt attempted a complete ſeries of experiments upon it, which were interrupted by his death. Chemiſts ſtill continued to regard biſmuth as an alloy, and not an original metal; but this opinion has gradually ſubſided.

(2032.) The ores of biſmuth occur chiefly in Germany, from whoſe miners it derived its name, and we underſtand they meant to expreſs by it *growing* or *incipient ſilver*. Its ores abound more in Saxony than in any other country where they have been yet diſcovered. They alſo occur in Sweden, France, and Cornwal. They are not abundant, and chiefly accompany veins of cobalt in primitive rocks. They are, 1. Native biſmuth. 2. Sulphurets of biſmuth, which are often combined with copper. 3. Oxides, commonly called *biſmuth ochre*, which is very rare. To extract biſmuth from its ores, the mineral is reduced to powder, well waſhed, and mixed with about one-fourth of its weight of black flux. It is then put into a well covered crucible lined with charcoal, and ſubjected to a moderate heat quickly applied, to prevent its evaporation. The metal remains in the bottom of the crucible.

(2033.) Biſmuth is of a reddiſh white colour, and is compoſed of broad brilliant plates adhering to each other. It ſoon loſes its luſtre, and acquires a dark colour, when expoſed to the air; but is not altered under water. Its ſpecific gravity is 9·822. Its denſity is increaſed by cautious hammering, but it breaks when ſmartly ſtruck. It cannot be drawn into wire though a rod $\frac{1}{10}$th inch diameter ſupports nearly 29 lbs. At 476° it melts, and if the heat be much increaſed it evaporates, and may be wholly diſtilled over in cloſe veſſels. When ſlowly cooled, and the liquid metal is poured out after the ſurface congeals, it is found to have cryſtallized in parallelopipeds, which croſs each other at right angles.

(2034.) When kept melted in an open veſſel, it is ſoon covered with a dark blue cruſt, which being removed, another ſucceeds until the whole is oxidized. Theſe cruſts being collected and kept hot, with agitation in an open veſſel, are ſoon changed into a browniſh or yellowiſh powder. When biſmuth is ſubjected to a ſtrong red heat in an open veſſel, it burns with a faint blue flame, and emits a yellow ſmoke. This being collected, is no longer volatile, and is *yellow oxide of biſmuth*. This is the only oxide of biſmuth yet diſtinctly known, and it contains

89·3 biſmuth,
10·7 oxygen.

100

This oxide is eaſily reduced by heating it with charcoal or other combuſtible bodies, for biſmuth has but a weak affinity for oxygen.

(2035.) Biſmuth does not combine with any of the ſimple combuſtibles except with ſulphur. Pelletier, it is true, by dropping phoſphorus into melted biſmuth, did produce a compound, which ſeemed rather a mechanical mixture, than a chemical union. But ſulphur combines readily with biſmuth when dropped into it in fuſion. The ſulphuret of biſmuth is of a bluiſh grey colour, cryſtallizes in tetrahedral needles which croſs each other. In its cryſtallized ſtate, it contains about

85 biſmuth,
15 ſulphur.

100

(2036.) Biſmuth combines with moſt of the metals, but few of its alloys are applied to any uſe. With gold it forms a brittle alloy, and the bulk of the metals is diminiſhed after union. But if the proportion of biſmuth be much diminiſhed, while that of copper is increaſed, the alloy expands. Biſmuth alſo forms brittle compounds with platinum and with ſilver.

(2037.) Biſmuth combines readily with mercury, when they are rubbed together in a mortar, or when two parts of hot mercury are poured into one of biſmuth. This amalgam becomes gradually hard, and when cooled ſlowly after fuſion it cryſtallizes. When the quantity of mercury conſiderably exceeds the biſmuth, the amalgam remains fluid, and diſſolves and renders lead alſo fluid. Three parts mercury, one lead, and one biſmuth form an amalgam which may be ſqueezed through ſhamoy leather without decompoſition. Mercury is often adulterated by a mixture of theſe metals, but the fraud may eaſily be diſcovered by its diminiſhed ſpecific gravity, or by its *dragging a tail* as the workmen expreſs it. That is, its drops do not remain ſpherical on a ſmooth ſurface, and they leave a tail behind when they are moved along. This amalgam is uſed when hot for ſilvering glaſs balls.

(2038.) Biſmuth forms with copper a brittle alloy. With iron it combines imperfectly, and the alloy is brittle.—With tin it readily unites, and a ſmall proportion of biſmuth increaſes the hardneſs, ſonorouſneſs, and increaſes the brightneſs of tin. Hence it often enters into the compoſition of *pewter*. An alloy of equal parts of tin and biſmuth melts at 280°.

(2039.) With lead biſmuth forms an alloy of a dark grey colour and cloſe grain. It is ductile unleſs the biſmuth much exceeds the lead. The tenacity of three parts lead, and two of biſmuth, is ten times greater than that of pure lead. In this alloy the original bulk of the metals is diminiſhed.

(2040.) When eight parts of biſmuth, five of lead, and three of tin are melted together, they form a white alloy which melts at 212°, and therefore remains melted under boiling water.—The alloy of biſmuth and nickel is brittle, and this metal does not combine with zinc.

(2041.) The order of the affinities of biſmuth for the metals, according to Bergman, follows.

BISMUTH.

Lead,
Silver,
Gold,
Mercury,
Antimony,
Tin,
Copper,
Platinum,
Nickel,
Iron.

(2042.) The oxide of biſmuth combines with acids, forming the *ſalts of Biſmuth*. As theſe have not been much attended to, we ſhall content ourſelves with an account of a few of the moſt remarkable.—One curious property of theſe ſalts is, that when water is poured into them they are decompoſed, and the oxide, or a ſubacid combination, are precipitated in the form of a white powder. A plate of copper or tin put into a ſolution of biſmuth, precipitate the metal in its metallic ſtate.

(2043.) The order of the affinity of the oxide of biſmuth for acids, according to Bergman, is as follows:

OXIDE *of* BISMUTH.

Oxalic acid,
Arſenic,
Tartaric,
Phoſphoric,
Sulphuric,
Muriatic,
Nitric,
Fluoric,
Saclactic,
Succinic,
Citric,
Lactic,
Acetic,
Pruſſic,
Carbonic.

I. SULPHATE *of* BISMUTH.

(2044.) The ſulphuric acid, only when aſſiſted by heat, converts biſmuth into a white oxide. Sulphurous acid gas, and if the heat be great, ſulphur are ſublimed. Water ſeparates almoſt all the ſulphuric acid from this compound, with a part of the oxide, and the ſolution yields cryſtals in needles by evaporation. Theſe cryſtals are decompoſed, and their baſe ſeparated by ſolution in water.

II. SULPHITE *of* BISMUTH.

(2045.) Sulphurous acid only acts upon the oxide of biſmuth, with which it forms a ſalt inſoluble in water, even with exceſs of acid.

III. NITRATE *of* BISMUTH.

(2046.) Concentrated nitric acid acts with great violence with biſmuth, with much heat, and ſometimes it is ſaid with the emiſſion of ſparks of fire. The acid is decompoſed, and much nitrous gas eſcapes. When the acid is diluted, its action is leſs violent, and the oxide is diſſolved as it forms. The ſolution is colourleſs, and yields white cryſtals, which are ſmall four-ſided priſms, often terminated by four-ſided ſummits. By expoſure to the air theſe attract a little moiſture, and their ſurface becomes encruſted with white oxide. They detonate feebly on burning coals, but fulminate when triturated with phoſphorus. When thrown into water the acid ſeparates, and white oxide of biſmuth in union with a ſmall portion of acid is precipitated. Hence if we write upon black or coloured paper with a nitric ſolution of biſmuth, the characters are inviſible, but become white when the paper is dipped into water. The *ſubnitrate of biſmuth*, which ſeparates when nitric ſolution of biſmuth is much diluted with water, was long known by the name of *magiſtery of biſmuth*. The paint called *pearl white*, which is often uſed for whitening the ſkin, and which it ſoon injures very much, is precipitated from nitrate of biſmuth by common ſalt or tartar. Sulphureted hydrogen gas, which often abounds in crouded aſſemblies, changes it to a deep grey, brown, or even black colour.

IV. MURIATE *of* BISMUTH.

(2047.) The muriatic acid, unleſs aſſiſted by heat, hardly acts upon biſmuth. But when diſtilled from that metal in the ſtate of powder, it oxidizes it, in the form of a white powder. The nitro-muriatic acid, and the oxymuriatic acid, readily diſſolve biſmuth, and form with it the muriate of biſmuth, which yields, by evaporation, ſmall priſmatic cryſtals. When evaporated to dryneſs, this ſalt ſublimes with a moderate heat, and forms a thick maſs which melts readily by heat, and was long known by the name of *butter of biſmuth*. It may alſo be prepared by diſtilling two parts of oxymuriate of mercury, and one part of biſmuth, mixed in a retort. The *butter* comes over, while an amalgam of biſmuth remains in the retort.

(2048.) The other ſalts of biſmuth do not ſeem deſerving of particular notice.—Its oxide conveys to glaſs a greeniſh yellow colour, and is employed in the porcelain mannfactories to produce this colour in their enamel paintings, or mixed with other oxides to produce a variety of ſhades.

SECT. XVI. ANTIMONY.

(2049.) It does not appear that the ancients were acquainted with antimony as a metal, but they ſeem to have been acquainted with its oxide which they applied to ſore eyes, and with its ſulphuret which the Aſiatic and German ladies employed to paint their eyebrows black. Who firſt reduced it into a metal is not known, but Baſil Valentine, in his *Currus Triumphalis Antimonii*, was the firſt who deſcribed this proceſs. None of the metals have been the ſubjects of ſo much controverſy, or of ſuch voluminous writing as antimony. By one party of phyſicians it was extolled as an infallible cure for all diſeaſes; while by another it was reviled as a deadly poiſon which ought to be expunged from the liſt of medicines.

(2050.) The ores of antimony occur chiefly in veins in the primary, and ſome of the older ſecondary mountains. They are found in Sweden, Norway, Germany, France, &c. in Cornwal, and a very promiſing vein was lately diſcovered in Dumfries-ſhire. This metal ſometimes occurs 1. *Native*, at Sahlberg in Sweden, at Allemont in France, and at Andreaſberg in the Harts. It is of a tin white colour, and contains ſome ſilver and iron. 2. *Sulphurets of antimony*, which are by far the moſt abundant of its ores. Theſe are either of a grey or black colour, and are called *grey* or *black ores*, of which there are ſeveral varieties. 3. *Oxides*, which are divided into the *red ore*, and the *white ore*, and antimony *ochre*.

(2051.) To reduce the ſulphuret of antimony, it is firſt roaſted to expel the ſulphur. It is then mixed with its own weight of black flux, made into a paſte with oil, and expoſed to a ſtrong heat in a crucible. After the proceſs, the pure metal is found at the bottom. Or, eight parts of ſulphuret of antimony, ſix of tartar, and three of nitre, reduced to powder, are well mixed, and projected in ſmall quantities at a time into a red hot crucible. They detonate, and the tartar from the charcoal it contains forms with the potaſh of the nitre a black flux which reduces the ore. It is afterwards melted in a conical iron pot, and after it is cool the metal is found with needle-ſhaped cryſtals, in the form of a ſtar upon its ſurface.

(2052.) Antimony exhibits conſiderable brilliancy, and is of a greyiſh white colour. It is of a laminated texture, and is made up of plates croſſing each other in every direction. When allowed ſlowly to cool from fuſion, its ſurface exhibits ſuch cryſtals as we have deſcribed. The fingers, when rubbed upon it, acquire a peculiar taſte and ſmell. Its ſpecific gravity, according to Briſſon, is 6·702; according to Bergman, 6·86; according to Hatchett, 6·712.—It is brittle, and may eaſily be pulverized in a mortar. A rod of it ⅒th inch diameter, ſupports about 10 lbs.—Heated juſt to redneſs it melts, and on ſlow cooling, forms oblong cryſtals perpendicular to the ſurface of the veſſel in which it cools. If the heat be much increaſed, it riſes in vapour. In the air it loſes its luſtre, but undergoes no other change. When the ſteam of water paſſes over red hot antimony in a tube, it produces detonations, with a rapid oxidizement of the metal. Kept in cold water, it undergoes no change. Heated in an open veſſel, it combines with oxygen, and riſes in white vapour. This vapour, when condenſed and collected, was formerly called *argentine flowers of antimony*. Heated to whiteneſs, and ſuddenly agitated, it burns and forms the ſame white oxide.

(2053. Thenard thought he had diſcovered ſix different oxides of antimony, but differing from each other in ſuch minute proportions of oxygen, that they do not ſeem tangible. There may be ſlight variations in the proportions of oxygen which combine with this, as well as with all the other metals; but Prouſt has ſhewn that there are only two deciſive oxides of antimony, the *protoxide*, and the *peroxide*.

(2054.) To obtain the protoxide, diſſolve antimony in muriatic acid, and add water. A precipitate appears, which waſh with water, and boil ſome time in a ſolution of carbonate of potaſh. Then throw the precipitate on a filter, waſh it well with pure water, and dry it. What remains upon the filter is the *protoxide of antimony*. It melts at a moderate heat, and evaporates if the heat be increaſed. When allowed to cool and conſolidate from melting, its ſurface exhibits yellowiſh white opaque cryſtals. Its conſtituents are

81·5 antimony,
18·5 oxygen.
———
100

(2055.) The peroxide is formed by burning antimony in open veſſels with a violent heat. This oxide more eaſily riſes in vapour than the former, and forms white priſmatic cryſtals of a ſilvery luſtre. It is leſs ſoluble in acids than the protoxide; and when melted with a fourth part of antimony, the whole is changed into protoxide. It is compoſed of

77 antimony,
23 oxygen.
———
100

(2056.) Of the ſimple combuſtibles, antimony only combines with ſulphur and phoſphorus.—The ſulphuret of antimony is a native ore, and it may be formed by mixing and melting antimony and ſulphur together. It is of a dark bluiſh grey colour; is much more fuſible than antimony, and cryſtallizes by ſlow cooling. Its conſtituents are, according to

	Bergman,	*Prouſt*.
Antimony,	74	75
Sulphur,	26	25
	100	100

(2057.) The protoxide of antimony combines with different proportions of the ſulphuret, by fuſion. About eight parts of oxide and one of ſulphuret, form a ſemitranſparent compound of a red colour, which is called the *glaſs of antimony* by the apothecaries. Eight parts of oxide and two of ſulphuret form an opaque maſs, of a yellowiſh red colour, which they call the *crocus metallorum*. Eight parts of oxide and four of ſulphuret, form the *liver of antimony* of the apothecaries.

(2058.) The phoſphuret of antimony may be formed by dropping bits of phoſphorus into melted antimony, or by mixing equal parts of antimony and phoſphoric glaſs, with a little charcoal powder, and melting them in a crucible. It is white, brittle, and appears laminated when broken. When melted it emits a green flame, and white oxide of antimony ſublimes.

(2059.) Antimony combines by fuſion with moſt of the metals; but few of its alloys have been applied to any uſe.—With gold, platinum, and ſilver it forms brittle alloys, in which the original bulk of the metals is contracted.—With mercury it forms an amalgam when it is poured, in fuſion, into mercury almoſt boiling hot. But the mercury ry ſeparates from the ſofter amalgams. With iron it forms a hard, white, brittle alloy.

(2060.) The alloy of antimony and tin is white and brittle, and is uſed for pewter and other purpoſes; alſo for making the plates on which muſic is engraved.—The alloy with lead is the moſt uſeful of any which this metal forms. Three parts of lead and one of antimony, form a hard malleable and compact alloy. Twelve parts of lead and one of antimony, form a malleable alloy much harder than lead. Sixteen parts of lead and one of antimony form an alloy reſembling lead, but harder. This laſt alloy takes a ſharp impreſſion in a mould, and is the compoſition of which printer's types are formed.—The other alloys of antimony do not ſeem deſerving of particular notice.

(2061.) The order of the affinity of antimony for metals, according to Bergman, is as follows.

ANTIMONY.

Iron,
Copper,
Tin,
Lead,
Nickel,
Silver,
Biſmuth,
Zinc,
Gold,
Platinum,
Mercury,
Arſenic,
Cobalt.

(2062.) The oxides of antimony combine with acids, forming *ſalts of antimony*. But as theſe oxides combine with difficulty, and do not ſeem capable of forming permanent combinations with acids, unleſs there be preſent an alkali, or an earth, ſo as to form them into triple ſalts, little progreſs has yet been made in inveſtigating the properties of pure ſalts of antimony. We ſhall only, as uſual, notice a few of thoſe double or triple ſalts, which may ſerve for illuſtration, or which have been applied to any uſe.—The order of affinity of oxide of antimony with acids, according to Bergman, is the following.

OXIDE OF ANTIMONY.

Muriatic acid,
Oxalic,
Sulphuric,
Nitric,
Tartaric,
Saclactic,
Phoſphoric,
Citric,
Succinic,
Fluoric,
Arſenic,
Lactic,
Acetic,
Boracic,
Pruſſic,
Carbonic.

I. SULPHATE OF ANTIMONY.

(2063.) Sulphuric acid only acts upon antimony when boiled upon it, and the acid is decompoſed. Sulphurous acid gas eſcapes with efferveſcence, and even ſulphur is ſublimed. There remains a white maſs, compoſed of ſulphuric acid and peroxide of antimony. Water detaches moſt of the acid, and there remains a white powder, which is ſubſulphate of antimony; being the oxide combined with a ſmall portion of ſulphuric acid, inſoluble in water, and uncryſtallizable.

II. SULPHITE OF ANTIMONY.

(2064.) Heated ſulphurous acid changes antimony into an oxide. But when ſulphurous acid is poured into a muriatic ſolution of antimony the ſulphite of antimony is precipitated in the ſtate of white powder, which is inſoluble in water.

III. NITRATE OF ANTIMONY.

(2065.) When nitric acid acts on antimony, a portion both of the acid and of water are decompoſed. The metal is converted into a white inſoluble oxide, part of which is diſſolved in the undecompoſed acid, but drops from it on adding water.

IV. MURIATE OF ANTIMONY.

(2066.) When muriatic acid is long kept on antimony it forms with it a yellow ſolution which yields, by evaporation, needle-formed cryſtals. Muriatic acid eaſily diſſolves the oxides of antimony; and the nitro-muriatic acid is the beſt ſolvent of the metal. It forms an *oxymuriate of antimony*. This ſalt was formerly called *butter of antimony*. It was commonly prepared by triturating one part of antimony, and two parts of oxymuriate of mercury together in a glaſs mortar. The mixture being diſtilled with a moderate heat, there came over a thick greaſy maſs, of a greyiſh white colour, and ſometimes cryſtallized in four-ſided priſms. It eaſily melts, and is decompoſed by diluting it with water, which ſeparates a white powder, formerly known by the name of *powder of algaroth*.

V. FLUATE OF ANTIMONY.

VI. BORATE OF ANTIMONY.

VII. PHOSPHATE OF ANTIMONY.

VIII PHOSPHATE OF LIME AND ANTIMONY.

(2967.) Dr Pearſon aſcertained that the celebrated medicine which has long been known under the name of *James's powder*, and uſed as a diaphoretic and emetic, is a compoſition of this ſort According to him it conſiſts of about

43 phoſphate of lime,
57 oxide of antimony.
———
100

This powder may be formed by calcining in a white heat a mixture of equal parts of ſulphuret of antimony, and the aſhes of bones. Its component ingredients probably vary, and Mr Chenevix conſiders it not as a chemical compound, but a mechanical mixture.—He lays down the following rule for preparing it.—Diſſolve in a minimum of of muriatic acid equal parts of white oxide of antimony, and of phoſphate of lime. Throw the ſolution into a ſufficient quantity of diſtilled water, which holds pure ammonia in ſolution. The powder precipitates. M. Pully, an Italian chemiſt has publiſhed a different analyſis from the preceding, and recommends the following proceſs for making the powder. which he aſſures us anſwers perfectly well.—Take of

Sulphuret of antimony	2 parts
Calcined bones	1½
Nitrate of potaſh	4

Triturate theſe bodies well together, and heat them ſtrongly in a covered crucible.

IX. ACETATE OF ANTIMONY.

(2068.) The acetic acid diſſolves a ſmall portion of the oxide of antimony, and the ſolution yields ſmall cryſtals. This ſalt has been employed as an emetic.

X. TARTRATE OF POTASH AND ANTIMONY.

(2069.) This triple ſalt is uſually known by the name of *tartar emetic*, and it has been more employed in medicine than all the other preparations of antimony put together. It is ſaid to have been firſt invented by a Dudley Earl of Warwick; and it acquired great celebrity in Italy in conſequence of the wonderful cures it effected. Many methods have been adopted for its preparation; but the one now generally employed is as follows.—Equal weights of the glaſs or of the peroxide of antimony, and of tartar, are well mixed and boiled in ten or twelve times their weight of water, until the tartar be ſaturated. The ſolution is then filtered, and boiled until a pellicle appears on its ſurface. After which it depoſits, on cooling, cryſtals in regular tetrahedrons, which are *tartar emetic*. As ſome uncombined tartrate of potaſh remains in the ſolution, the evaporation ought not to be carried too far, otherwiſe its cryſtals will be depoſited with thoſe of tartar emetic. This ſalt effloreſces in the air; is ſoluble in 14½ parts of cold water, and in about 2 parts of boiling water. It is decompoſed by heat, by alkalies and alkaline earths, by ſeveral of the metals, and by bitter and aſtringent decoctions of plants, ſuch as Peruvian bark, &c. and hence ſhould not be adminiſtered in union with ſuch bodies. From Thenard it appears that it is compoſed of

56·3	tartrate of antimony,
35·4	tartrate of potaſh,
8·3	water.
100	

HYDROSULPHURET OF ANTIMONY.—

When hydroſulphuret of potaſh or ammonia is dropped into an acid ſolution of antimony, a beautiful orange coloured precipitate falls, which was much celebrated as a medicine about the beginning of laſt century, under the name of *Kermes mineral*. It is commonly prepared by triturating in a mortar 16 parts of ſulphuret of antimony, 8 parts of potaſh and one part of ſulphur. The mixture is then melted in a crucible, and poured into an iron veſſel. When cold it is reduced to powder, boiled in a large quantity of water, and filtered while hot. While cooling it depoſits a yellow powder, which is the kermes. The powder being well waſhed with water, is dried.—Or ſix parts of potaſh may be diſſolved in twenty parts of water, and after the ſolution is made boiling hot, one part of ſulphuret of antimony in powder may be added. The ſolution being well ſtirred, boiled a ſhort time, and filtered while hot, depoſits the kermes on cooling.—Thenard aſcertained that this powder called kermes conſiſts of

20·30	ſulphureted hydrogen,
4·15	ſulphur,
72·76	protoxide of antimony,
2·79	water and loſs.
100	

(2070.) After the mineral kermes have been precipitated from the ſolution, by any of the methods above deſcribed, if an acid be dropped into the remaining liquid another precipitate takes place, of a beautiful orange colour, and hence called *ſulphur auratum*. According to Thenard this laſt precipitate is compoſed of

17·87	ſulphureted hydrogen,
68·30	protoxide of antimony,
12·00	ſulphur.
98·17	

Goettling propoſes to obtain this compound by diſſolving two parts of ſulphuret of antimony, and three parts of ſulphur well mixed, in a boiling ſolution of pure potaſh. The ſolution being diluted with water, is precipitated by weak ſulphuric acid.

Antimonial preparations are not now ſo much uſed in medicine as they were formerly, though a few of them ſtill maintain their ground. Its oxides are uſed to convey to glaſs, porcelain, and enamels, ſhades of brown, orange, and yellow colours. In order to vary the colours, its oxides are often mixed, in various proportions, with the oxides of other metals.

SECT. XVII. TELLURIUM

(2071.) This metal has only been found in a mineral which occurs in a mine which yields gold near Zalethna in Tranſylvania. Mineralogiſts were long at a loſs about this mineral and diſtinguiſhed it by the names of *aurum problematicum*, *aurum paradoxicum*, *aurum album*. Muller, who examined it chemically, in 1782, concluded that this ore contained a new metal. Mr Kirwan, in the ſecond edition of his *Mineralogy*, publiſhed 1796, gave it the name of *ſylvanite*, from the name of the country where it is found. Klaproth in 1798 completely confirmed the concluſions of Muller, and gave this new metal the name of *tellurium*, which it now retains.—This metal occurs native, combined with gold, ſilver, iron, copper, and ſometimes a little ſulphur.

(2072.) It is very brittle, and may eaſily be reduced to powder. Its brilliancy is conſiderable; its colour intermediate between that of Zinc and lead; its texture laminated like antimony. According to Klaproth, its ſpecific gravity is 6·115.

(2073.) Its melting point is ſomewhat higher than that of lead. If the heat be increaſed it boils, and flies off in vapour; and in cloſe veſſels forms brilliant drops in the upper part of the veſſel. Expoſed to the blow-pipe on charcoal, it takes fire, and burns with a lively blue flame, whoſe edges are tipped with green. It goes entirely off in white ſmoke which Klaproth obſerved to have a ſmell not unlike that of radiſhes. This white ſmoke is the *oxide of tellurium*; and it may alſo be obtained by diſſolving the metal in nitric acid, and precipitating by potaſh. Or by diſſolving the metal in nitro-muriatic acid, and adding to the ſolution a great quantity of water. In either caſe a white powder falls, which is the oxide of tellurium. This oxide eaſily melts by heat into a ſtraw-coloured maſs, of a radiated texture. If made into a paſte with oil, and heated among charcoal, it is ſo rapidly reduced to the metallic ſtate, that an exploſion takes place.

(2074.) Tellurium combines with ſulphur by fuſion, and its ſulphuret has a leaden grey colour. It amalgamates with mercury by trituration.—This metal being in ſmall quantity, and but lately diſcovered, few of its acid combinations have been attended to.

I. Sulphate of Tellurium.

(2075.) When one part of tellurium, and 100 of ſtrong ſulphuric acid are put into a cloſe veſſel, a ſolution takes place, and the liquid acquires a bright crimſon colour. When water is dropped into the acid, the colour diſappears, and the metal is precipitated in black flakes. Heat alſo deſtroys the colour, and precipitates a white powder. This metal diſſolves readily in diluted ſulphuric acid. The ſolution is colourleſs, and no precipitate is produced by adding water.

II. Nitrate of Tellurium.

(2076.) This metal forms a colourleſs ſolution with nitric acid, which is not precipitated by water. By evaporation the ſolution yields ſmall, white, light, needle-ſhaped, deneritical cryſtals.

III. Muriate of Tellurium.

(2077.) This metal diſſolves readily in nitro-muriatic acid, forming a colourleſs ſolution. On adding water, the white oxide is precipitated, and is again diſſolved on adding more water. Alcohol alſo precipitates the oxide.

Sect. XVIII. Arsenic.

(2078.) Though ſome of the ores of Arſenic were known to the ancients, and uſed by them in painting, arſenic, in its metallic ſtate was not known until about 1694. It was afterwards farther elucidated by Brandt, Mauquer, Monnet, Bergman, and Scheele.

(2079.) The ores of arſenic abound very much in nature, and it is chiefly found combined with other metals, when they are ſaid to be mineralized by arſenic. When theſe ores are roaſted, the arſenic is expelled from them, and is ſometimes collected in long galleries where the powder depoſits. But its ores are ſometimes found forming veins in the primary mountains, and rarely in the ſecondary. In theſe caſes it occurs. 1. Native, in dark coloured maſſes, which exhibit the metallic luſtre of the fracture. 2. The moſt frequent ore of arſenic is its ſulphuret, which when of a yellow colour is called *orpiment*, and when of a red colour is called *realgar*. 3. It alſo, though rarely, occurs in the ſtate of white oxide, or arſenious acid, when it obtains the name of *white arſenic*.

(2080.) This metal and its oxide being very volatile, its preſence in any mineral may be detected by throwing a little of it on burning coals. If arſenic be preſent it will exhale a ſmell of garlic. To reduce it to the metallic ſtate, its oxide is mixed with three times its weight of black flux, and is put into a crucible which has another crucible luted on its mouth. The lower crucible containing the mixture is expoſed to heat, while the upper crucible is kept as cool as poſſible by a plate of iron, or by blowing upon it with bellows. After the apparatus has cooled, a cryſtallized cruſt of metallic arſenic is found in the upper crucible.

(2081.) Arſenic has a good deal of brilliancy, and in colour ſomewhat reſembles ſteel. Its ſpecific gravity is 8·31. It is extremely brittle, and can eaſily be reduced to fine powder. It has no ſmell when cold, but exhales a ſtrong ſmell of garlic when heated, which diſtinguiſhes it from all other metals. It riſes in vapour, without melting at 356° and is the moſt volatile of all the metals Its cryſtals are tetrahedrons. It is not altered under water, but ſoon becomes black, and falls into powder when expoſed to the air.

(2082.) It is the moſt combuſtible of all the metals, and it burns when heated in an open veſſel with a pale blue flame. It exhales when heated in the form of a white powder, which is the *protoxide* of arſenic. This is extracted during the proceſs of roaſting the ores of other metals, and is known in commerce under the names of *arſenic*, or *white arſenic*. Chemiſts call it *white oxide of arſenic*. Fourcroy *arſenious acid*, becauſe it poſſeſſes the properties of an acid. It is a white brittle ſubſtance, of a glaſſy appearance. It is ſoluble in 80 times its weight of water at 60°, and in 15 of boiling water. It reddens vegetable blues, has an acrid taſte, but afterwards leaves an impreſſion of ſweetneſs. It is a moſt virulent poiſon; when ſlowly evaporated cryſtallizes in regular tetrahedrons. It combines with metals and generally renders them brittle. It ſublimes at 383°, with a ſtrong garlic ſmell. It is ſoluble in from 70 to 80 parts of alcohol, and in oils. According to Prouſt it is compoſed of

75·2 arſenic,
24·8 oxygen.

100

(2083.) But arſenic combines with a higher doſe of oxygen than the one juſt deſcribed, and when charged with a maximum of oxygen, it forms arſenic acid, which was explained (864, 865, &c.) and need not be here repeated.

(2084.) Arſenic combines with all the ſimple combuſtibles. If four parts of granulated zinc, and one part of arſenic, be mixed, and have ſulphuric acid poured upon them which is diluted with twice its weight of water, abundance of hydrogen gas eſcapes in combination with arſenic. This arſenical hydrogen gas is colourleſs, of a garlic ſmell, extinguiſhes flame and animal life. A 100 cubic inches of it weighs 16·4 grains. It burns with a blue flame and it explodes when two parts of this gas and three of oxygen are brought in contact with a lighted taper. The product is water and white oxide of arſenic. Oxymuriatic acid diminiſhes its bluſh, and cauſes it to depoſit yellow flaſhes. Nitric acid ſuddenly mixed, cauſes it to evolve red fumes, and an exploſion takes place with flame.

(2085.) Arſenic unites readily with ſulphur. If a mixture of theſe bodies be melted in a covered crucible, a red vitreous maſs is obtained, which is a ſulphuret of arſenic. This mixture abounds in nature, and is uſually called *realgar*. It has a ſcarlet colour, and is often cryſtallized in tranſparent priſms. Its ſpecific gravity is 3·225. It is often uſed as a paint, but Macquer affirms it to be poiſonous.

(2086.) If white oxide of arſenic be diſſolved in muriatic acid, and ſulphureted hydrogen be added in ſolution, a fine yellow powder is precipitated. Or it may be formed by ſubliming arſenic and ſulphur with a heat not ſufficient to melt them. This mixture is alſo found native, and is uſually called *orpiment*. Its ſpecific gravity is 5·315. Chemiſts differ about its nature; but it is now generally underſtood to be a ſulphuret of arſenic.

(2087.) Arſenic combines with moſt of the metals, but as few of its alloys are applied to uſe, a minute deſcription of them does not ſeem neceſſary. With gold it combines moſt readily, when its fumes are made to act upon a plate of gold heated red hot. The alloy is grey and very brittle. With platinum and ſilver it forms brittle alloys. With mercury it forms a grey amalgam, after they are long ſtirred over a fire.

(2088.) With copper arſenic combines, when they are melted in a cloſe crucible, with ſome common ſalt to exclude the air. A little biſmuth is commonly added, and when the proportion of the arſenic is ſmall the alloy is ductile and malleable. It is commonly called *white copper*, and *white tombac*, and is uſed for various purpoſes. Iron combines with arſenic, and this compound occurs native, and is known by the name of *miſpickel*. Arſenic deſtroys the magnetic virtue of iron. Tin combines with arſenic, and the alloy is whiter, harder, and more brittle than tin, unleſs the proportion of arſenic be very ſmall. Lead combines with about $\frac{1}{8}$ of arſenic. The alloy is hard and black and is uſed for making ſmall ſhot. Arſenic likewiſe combines with nickel, zinc, antimony and biſmuth.

(2089.) Arſenic poſſeſſing the property of combining with oxygen, and aſſuming the properties of an acid itſelf, in this ſtate it combines with many of the oxides of other metals, forming arſenical ſalts. But when the other acids act upon arſenic, they oxidize it, and the ſalt formed is ſeldom ſoluble in water. It hence ſeems unneceſſary to enter into the *ſalts* of arſenic.

III. METALS BRITTLE AND OF DIFFICULT FUSION.

SECT. XIX. COBALT.

(2090.) NONE of the metals which follow ſeem to have been known to the ancients. The name *cobalt* or *cobolt* ſeems to have been derived from *cobalus*, a fancied evil ſpirit which the German miners ſuppoſed to haunt their mines and to do a great deal of miſchief. Since the 15th century the mineral which had obtained this name, has been employed to tinge glaſs of a blue colour. But it was not known to contain a new metal until it was examined by Brandt, a celebrated Swediſh chemiſt in 1733. Much additional light was thrown upon the ſubject by the labours of Lehmann, Bergman, Taſſaert, Thenard and others.

(2091.) The ores of cobalt are not abundant, and hence this metal is of conſiderable value. They abound chiefly in Germany, Sweden, Norway, and Hungary. They have alſo been found in Britain and France, tho' in very ſmall quantity. Its ores are either alloys with other metals, or they are oxides, or ſalts. The moſt abundant of theſe ores, and the only one wrought for uſeful purpoſes, is of a white colour, and it is chiefly alloyed with arſenic. To reduce the metal, the ore is firſt roaſted, and is then mixed with black flux and common ſalt, and expoſed to a forge heat in a crucible lined with charcoal. The cobalt obtained in this manner always contains a portion of arſenic, nickel, iron, and other metals. Many proceſſes have been adopted for purifying it by acid ſolutions, but as theſe ſtill retain a degree of uncertainty, we forbear entering into them.

(2092.) The pureſt cobalt has little brilliancy, is of a grey colour with a ſhade of red. It is ſometimes fibrous, ſometimes granular ſometimes lamellated, according to the heat employed in its fuſion. Its ſpecific gravity is 7·7. It is ſo brittle that it may eaſily be reduced to powder. It melts at 130° of Wedgewood, but does not evaporate at any heat that has been applied to it. It cryſtallizes in irregular priſms. It is attracted by the magnet and Wenzel found it might be converted into a magnet ſimilar to thoſe made from iron. But it ſeems doubtful whether this property may not be owing to iron in its compoſition.

(2093.) It is not changed in the air, nor does it decompoſe water. When kept red hot in an open veſſel, it gradually imbibes oxygen, and is converted into a blue powder, which becomes deeper and deeper, until it appears black. With exceſſive heat the cobalt takes fire and burns with a red flame. Thenard aſcertained that cobalt combines with three different doſes of oxygen and forms three diſtinct oxides.

(2094.) The firſt oxide may be formed by diſſolving cobalt in nitric acid, and precipitating by means of potaſh. This oxide has a blue colour, but by drying in the open air, it becomes black. If this black powder be kept half an hour in a *cherry red* heat, the oxygen abſorbed in drying is expelled, and it is converted into a fine blue colour. The ſecond oxide of cobalt is obtained by cautiouſly drying the firſt oxide in the open air, without the aſſiſtance of heat, after its precipitation from acid ſolution by potaſh. It then aſſumes an olive green colour. If either the firſt or ſecond oxides be dried in the open air, with the aſſiſtance of heat they gradually aſſume a flea-brown colour, which at laſt becomes black. This is the third oxide of cobalt. The ſecond and third oxides emit oxymuriatic acid gas with efferveſcence, when they are diſſolved in muriatic acid. Hence the muriatic acid deprives theſe oxides of a part of their oxygen.

(2095.) Of the ſimple combuſtibles, cobalt only combines with ſulphur and phoſphorus. With ſulphur it does not directly combine, unleſs the ſulphur be previouſly combined with potaſh. The ſulphuret has a yellowiſh white colour. Phoſphorus combines with cobalt when ſmall bits of it are dropped upon the metal heated red hot. The phoſphuret is white and brittle, more fuſible than cobalt, and is decompoſed by heat.

(2096.) Cobalt ſeems capable of combining with moſt of the metals, but as its alloys have not been much examined, and none of them are applied to any uſe, we reckon a particular deſcription of them unneceſſary. The order of the affinities of cobalt with metals, according to Bergman, is the following.

COBALT.

Iron,
Nickel,
Arſenic,
Copper,
Gold,
Platinum,
Tin,
Antimony,
Zinc.

(2097.) The oxide of cobalt combines with acids, forming, *ſalts of cobalt*, a few of which we ſhall attempt to deſcribe. The order of the affinities of oxide of cobalt for acids, according to Bergman, is the following.

OXIDE OF COBALT.

Oxalic acid,
Muriatic,
Sulphuric,
Tartaric,
Nitric,
Phoſphoric,
Fluoric,
Saclatic,
Succinic,
Citric,
Lactic,
Acetic,
Arſenic,
Boracic,
Pruſſic,
Carbonic.

I. SULPHATE OF COBALT.

(2098.) When ſulphuric acid is boiled upon cobalt, part of it is decompoſed, ſulphurous acid gas eſcapes, and a browniſh red maſs remains which readily diſſolves in water. The ſolution is red, and yields ſmall needle ſhaped cryſtals of a reddiſh colour. They are ſoluble in 24 parts of water, are decompoſed by heat, and the deep blue oxide of cobalt remains behind. According to Bucholz this ſalt contains

26 acid,
30 oxide,
44 water.
———
100

II. NITRATE OF COBALT.

(2099.) Nitric acid acts upon cobalt when aſſiſted by heat. The ſolution yields ſmall priſmatic cryſtals of a red colour, which are decompoſed by heat, leaving a deep red powder.

III. NITRATE OF COBALT AND AMMONIA.

(2100.) When ammonia is added in exceſs to a ſolution of nitrate of cobalt, no precipitate enſues. The ſolution being evaporated to dryneſs, and water again added, a red ſolution is obtained, which, by ſlow evaporation, yields regular cubes of a red colour. Theſe cryſtals are compoſed of nitric acid, oxide of cobalt, and ammonia.

IV. MURIATE OF COBALT.

(2101.) The muriatic acid acts feebly on cobalt even when aſſiſted by heat. But it readily diſſolves its oxides, and when a little nitric acid is added, a ſolution is eaſily obtained of the metal itſelf. The concentrated ſolution is of a fine green colour but becomes red when diluted with water. By evaporation the ſolution yields ſmall deliqueſcent cryſtals of muriate of cobalt.

(2102.) If muriate of cobalt be ſo much diluted with water that lines drawn with it upon paper are not viſible, they aſſume a beautiful green colour when gently heated. Thus this ſalt forms the moſt curious of all the ſympathetic inks. A fireſcreen which repreſents winter, with trees deſtitute of foliage, may have leaves and verdure drawn upon it with this ink, which are not viſible until the ſcreen be placed before the fire, when it will ſuddenly exhibit all the verdure of ſummer. When allowed to cool, the verdure again diſappears and it may be revived as often as we pleaſe, provided it be not heated beyond a certain point. If this ſhould happen, the lines, or figures, drawn by the ink acquire a permanent brown colour. Below this point, which renders the colour permanent, the vividneſs of the green is in proportion to the degree of heat to which it is expoſed. Many theories have been adopted to account for this, but as none of them appear to be ſatisfactory, we ſhall not enter into them.—This ſympathetic ink is commonly prepared by diſſolving the zaffre of commerce in nitro-muriatic acid, and expelling the exceſs of acid if any there ſhould be, by heat. After which water is added, and the muriate of cobalt diluted to the proper conſiſtency.

V. ACETATE OF COBALT.

(2103.) The acetic acid does not act upon the metal, but diſſolves the oxide of cobalt, forming a deliqueſcent ſalt which does not cryſtallize. This ſalt is red while cold, but becomes blue when heated. When diluted it forms a ſympathetic ink, the lines and figures drawn by which are colourleſs when cold, but become blue when heated.—It does not ſeem neceſſary to detail any more of the ſalts of cobalt.

(2104.) The oxide of cobalt is much uſed for conveying a beautiful blue colour to glaſs, and for painting on porcelain and enamels. It is neceſſary that the proportion of oxide of cobalt ſhould be very ſmall, or the colour of the glaſs or porcelain will be black, or approaching to black. The intenſity of the blue may be varied *ad infinitum* by varying the proportions of the cobalt. For fine porcelain, the purer oxides of cobalt are uſed. For glaſs, coarſe pottery, and enamels, zaffre is commonly uſed, which is oxide of cobalt reduced to fine powder, and diſtended by a mixture of ſand. When zaffre is fuſed along with ſilica and an alkali, glaſs of a deep blue colour is obtained, which is known by the name of *ſmalt*. When this is reduced to powder, and agitated among a large quantity of water, the firſt portion which drops down is called *coarſe azure*. Four quantities are ſeparated in this way; and the laſt, which is the fineſt is called *azure of four fires*. Theſe powders are uſed in painting, and for various purpoſes. Except for chemical experiments, cobalt is never uſed in its metallic ſtate.

SECT. XX. MANGANESE.

(2105.) THOUGH a mineral under this name had long been known, and was ſo much uſed by glaſs-makers, to convey tranſparency to their glaſs, that it often went by the name of *glaſs-makers ſoap*, it was firſt ſuſpected to be a peculiar metal by Kaim of Vienna in 1770. Bergman and Scheele added confirmation to the conjectures of Kaim; but the perſon who firſt ſucceeded in reducing it to the metallic form was Dr Gahn, about 1774. His experiments were confirmed by Haeman in 1702, Hielm in 1785, and Bindheim in 1789.

(2106.) The ores of manganeſe are very abundant, and are found in Spain, France, Britain, Germany, Norway, Sweden, Siberia, and many other countries. They are all reducible to two general claſſes, Oxides, and Carbonates. The oxides are of two kinds, 1. Grey oxides. 2. Black oxides. The grey oxides are moſt abundant; the black oxides are generally found intermixed with the former. Of both there are ſeveral varieties, and they are often found cryſtallized. The carbonates are rare, and are of a red colour, hence called *red ore of manganeſe*, which by expoſure to the air changes to yellowiſh brown. Theſe ores occur, chiefly in veins, both in primary and ſecondary mountains.

(2107.) To reduce manganeſe to its metallic ſtate, a crucible muſt be coated internally with charcoal powder mixed with water or oil. The oxide of manganeſe muſt be reduced to fine powder, made into a paſte with oil, and placed in the crucible above charcoal, and the whole crucible filled with charcoal powder. Another crucible is now luted on, and the whole ſubjected to the moſt violent heat that can be procured, for about an hour. The charcoal attracts the oxygen of the oxide, and when the apparatus cools, the metal is found at the bottom of the crucible in globules diſperſed among the ſcoriæ. Its weight amounts to about one third of that of the oxide employed.

(2108.) Manganeſe generally contains a portion of iron, from which it can hardly be ſeparated. When pure it is of a granular texture, brilliant, and of a greyiſh white colour. According to Bergman, its ſpecific gravity is about 6·850. It is very brittle and melts at 160° of Wedgewood. When reduced to powder, it is attracted by the magnet, owing perhaps to iron in its compoſition.

(2109.) Expoſed to the air, and eſpecially when heated in an open veſſel, it rapidly attracts oxygen, and becomes grey, violet, brown, and at laſt black. By combining with three proportions of oxygen, it ſeems capable of forming three different oxides, the *white*, the *red*, and the *black*.

(2110.) The firſt or white oxide, may be formed by diſſolving the black oxide in nitric acid, with the addition of a little ſugar. The ſugar combines with the exceſs of oxygen, and eſcapes in carbonic acid gas, while the white oxide is diſſolved by the acid. By adding a ſolution of potaſh, it is precipitated in the form of a white powder. This white oxide if expoſed to the air ſoon attracts oxygen, and reverts to the ſtate of black oxide. According to Bergman it contains

80 manganeſe,
20 oxygen.
——
100

(2111.) The ſecond, or red oxide is obtained by making the black oxide of manganeſe into a paſte with ſulphuric acid, and heating them in a retort. A great quantity of oxygen gas comes over, and the oxide being deprived of part of its oxygen, diſſolves in the acid. Diſtil to dryneſs, and then pour water on the reſidue, and paſs it through a filter. A ſolution of ſulphate of manganeſe is obtained, of a red colour. On adding an alkaline ſolution, this oxide is precipitated in the form of a red powder. Expoſed to the air, the red oxide of manganeſe likewiſe attracts oxygen, and is converted into the black oxide. Its conſtitnents, according to Bergman are

74 manganeſe,
26 oxygen.
——
100

(2112.) The third, or black oxide, abounds in nature, and was the firſt ſubſtance which obtained the name of manganeſe. It may be ſoon formed by expoſing the metal, or any of the preceding oxides after precipitation from an acid, to the air, or to moderate heat, in an open veſſel. When the black oxide is heated to redneſs in an earthen or iron retort, it gives out a great quantity of oxygen gas, which may be collected in proper veſſels, and it approaches the ſtate of red oxide. The white oxide yields no oxygen gas, (ſee 512, 513), and bleachers who uſe great quantities of oxygen obtained from the black oxide of manganeſe, may cauſe the ſame material to reabſorb from the air the portion of oxygen of which they had deprived it. This oxide melts in a very violent heat into a green coloured glaſs. According to Fourcroy, the black oxide is compoſed of

60 manganeſe,
40 oxygen.
——
100

(2113.) Of the ſimple combuſtibles, manganeſe can only be combined with phoſphorus. Prouſt indeed found native phoſphuret of manganeſe in an ore of tellurium, but Bergman was not able to effect this combination by art. He ſucceeded indeed in combining eight parts of the black oxide with three of ſulphur, which formed a compound of a green colour.

(2114.) The phoſphuret of manganeſe may be formed by melting equal parts of the metal and of phoſphoric glaſs, or by dropping bits of phoſphorus upon red hot manganeſe. This compound is much more fuſible than the metal itſelf, is of a white colour, brittle, granular, and cryſtallizable. It is not altered by the air, but heat burns off the phoſphorus, and oxidizes the metal.

(2115.) Manganeſe combines with many of the metals,

metals, but as its alloys have not been much examined, we ſhall confine ourſelves to thoſe which have been propoſed for uſe.

(2116.) Bergman found that mangaueſe combined readily with copper, forming a very malleable alloy, of a red colour, which ſometimes becomes green by age. Gmelin ſucceeded in forming this alloy by fuſing the black oxide of manganeſe along with copper, and he propoſed to ſubſtitute this in place of the alloy of copper and arſenic, which is much employed in the arts, but is very dangerous for utenſils which are intended to hold potable liquids.—Manganeſe combines with iron, and makes it white and brittle.—It alſo combines with tin, but ſcarcely with zinc.

(2117.) It appears that only the white and red oxides of manganeſe, are capable of combining with the acids, and that the black oxide does not combine until after it has given out its exceſs of oxygen. For all we know of the *ſalts of manganeſe* we are indebted to the illuſtrious Bergman and Scheele, who alſo firſt made us acquainted with its oxide which has proved of ſuch importance as a chemical agent, and of ſuch extenſive uſe in arts and manufactures. The affinities of oxide of manganeſe for the acids are, according to Bergman, in the following order.

Oxide of Manganese.

Oxalic acid,
Citric,
Phoſphoric,
Fluoric,
Muriatic,
Sulphuric,
Nitric,
Saclactic,
Succinic,
Tartaric,
Lactic,
Acetic,
Pruſſic,
Carbonic.

I. Sulphate of Manganese.

(2118.) This ſalt exiſts in two ſtates, the *Sulphate*, and *Oxyſulphate* of Manganeſe.—The *ſulphate* is formed by diſſolving manganeſe in diluted ſulphuric acid, or by diſſolving the black oxide with the addition of a little ſugar. The ſame ſalt is formed when black oxide is diſſolved in ſulphurous acid, becauſe the oxide imparts a portion of its oxygen to the ſulphurous, and converts it into ſulphuric acid. The ſolution of this ſalt is colourleſs, and by evaporation yields tranſparent rhomboidal cryſtals, whoſe taſte is very bitter. Heat expels the acid; and alkalies precipitate a white powder, which is the white oxide of manganeſe.

(2119.) The *oxyſulphate of manganeſe* is formed in the way that was explained (2111.) when treating of the red oxide. This ſolution does not readily cryſtallize, but by evaporation aſſumes the gelatinous form. This ſalt is very ſoluble in water, and alkalies precipitate from it the red oxide. (2111.)

(2120.) As the marks which it is neceſſary to put upon cloth are apt to be effaced by bleaching in the oxymuriatic acid, Hauſſman propoſes a ſolution of ſulphate of manganeſe, mixed with ſugar, gum, or any vegetable ſubſtance, ſo as to bring it to the proper conſiſtency, by which lines or names may be written on the cloth. When expoſed to the oxymuriatic acid theſe figures acquire a permanently yellowiſh brown colour.

II. Nitrate of Manganese.

(2121.) Nitric acid diſſolves in manganeſe with effervеſcence and extraction of nitrous gas; it diſſolves the white oxide without effervеſcence; by long digeſtion on the black oxide a little of it is diſſolved, but the ſolution goes on rapidly if a little ſugar is added, See, (2110.) The Nitrous acid is converted into nitric acid, when it acts upon the black oxide and the oxide is converted into the white oxide which combines with the acid. In all theſe caſes only the white oxide combines with acid. The ſolution is colourleſs, and does not cryſtalliſe; heat expels the acid leaving the white oxide, which is alſo precipitated by alkalies.

III. Muriate of Manganese.

(2122.) The muriatic acid diſſolves manganeſe with emiſſion of hydrogen gas, it diſſolves white oxide without effervеſcence: when heated upon the black oxide, oxy-muriatic gas eſcapes with effervеſcence. See (778.) The acid divides into two portions one part of which abſorbs oxygen from the oxide and flies off in a ſtate of gas, the other portion combines with the white oxide thus formed. If ſugar or any vegetable ſubſtance be preſent, carbonic acid gas is emitted, and muriate of manganeſe formed, See (2110.) The ſolution of this ſalt is colourleſs and cryſtallizes with difficulty.

(2123.) We do not eſteem it neceſſary to enter farther, into the ſalts of manganeſe, not that we eſteem them uſeleſs but that they have not yet been converted to any uſe.

Sect. XXI. Chromium.

(2124.) A beautiful red mineral with a ſhade of yellow, generally cryſtallized in four ſided priſms, occurs in the mine Bereſof in Siberia, this mineral was uſed as a paint and is become exceedingly ſcarce and dear. Pallas ſuppoſed it a compound of various metals. Various opinions were advanced concerning its compoſition. Vauquelin in 1797 found it to be a combination of oxide of lead and a peculiar acid whoſe baſis was metallic. By expoſing this acid to a violent heat when mixed with charcoal powder, he obtained from it a new metal to which he gave the name of Chromium, from its property of communicating colour to other bodies. His concluſions were verified by Klaproth and other chemiſts.

This metal is of a white colour with a ſhade of yellow; it is very brittle, and only melts by exceſſive heat; it combines with three dozes of oxygen, forming the green and brown oxides, and the yellow when it aſſumes all the properties of an acid. The metal diſſolves with difficulty in the acids. The nitrate of chromium yields by evaporation octahedral cryſtals of a fine violet colour, but as the ore of this metal is very ſcarce and dear, few of its properties or combinations have been examined.

SECT. XXII. MOLYBDENUM.

(2125.) THE word *molybdenum* is derived from the term by which the Greeks denoted the mineral which the Latins called *plumbago*, and we indicate by the name of *black-lead*. The metallic ore now under conſideration very much reſembles plumbago, and was long confounded with it, until Scheele aſcertained the difference, and to this ore he aſſigned the name of molybdena.

(2126.) Only one ore of molybdenum has yet been found, namely the ſulphuret, and it occurs in various parts of the world, particularly in Inverneſsſhire. It occurs in various parts of the Iſland of Lewis, and particularly near the mouth of Loch Roag, in irregular veins, or detached maſſes in garnet rocks. It has always a leaden colour, ſtains the fingers, and marks bluiſh black. It is ſometimes cryſtallized in hexahedral priſms and tables, often maſſive, and ſometimes mouldered into ſand, or black mud.

(2127.) Scheele in 1778 obtained ſulphur from this ore, and a whitiſh powder, which poſſeſſed the properties of an acid. Hielm in 1782, by a laborious courſe of experiments firſt ſucceeded in reducing this powder to the metallic ſtate; and his concluſions have been confirmed by chemiſts of the firſt eminence.

(2128.) To reduce molybdenum, the ore is ſlowly and repeatedly roaſted in a moderate red heat, until it falls into fine powder, and paſſes through a ſieve. The powder is diſſolved in ammonia, the ſolution filtered, and evaporated to dryneſs. The reſiduum being moderately heated with a little nitric acid, leaves a white powder, which is oxide of molybdenum. This oxide being mixed with oil, or charcoal powder, and expoſed to a moſt violent heat, is reduced to the metallic ſtate. This metal has only been obtained in ſmall agglutinated metallic grains, which the moſt violent heat that can be applied has yet proved inſufficient to fuſe into a maſs, and hence its properties are very little known.

(2129.) It is of a yellowiſh white colour, internally greeniſh white. Its ſpecific gravity 7·400. When heated in an open veſſel, it attracts oxygen and is converted into white oxide, which ſublimes in ſmall needle ſhaped cryſtals. Mr Hatchet aſcertained that it is capable of forming four oxides, 1. The black; 2. The blue; 3. The green, to which he gave the name of *molybdous acid*; 4. The *yellow*, or *white*, which is the *molybdic acid*. (ſee 874, &c.)

(2130.) This metal readily combines with ſulphur, and the compound every way reſembles the *mineral ſulphuret of molybdenum*. It combines alſo with phoſphorus. Hielm with indefatigable induſtry aſcertained the effect of combining molybdenum in various proportions with other metals. He found iron to be the metal with which it united moſt readily, and with which its alloy is moſt likely to prove uſeful could molybdenum be obtained in ſufficient quantity.

(1130.) The oxides of molybdenum combine with ſeveral of the acids; but as two of its oxides are themſelves acids, it ſeems very probable that theſe oxides undergo changes during the act of their combination with acids. The only information we have upon this ſubject is from Bucholz, and it appears that the oxides of molybdenum are capable of forming cryſtallizable ſalts with acids. Another remarkable property of the ſalts of molybdenum is the various changes of colour to which they are liable. This we are inclined to aſcribe to changes in the degree of oxidation of their baſes. The oxides of molybdenum have never been tried in colouring glaſs, or enamel painting.

SECT XXIII. URANIUM.

(2132.) A mineral is found in the George Wagſfort mine in Saxony, to which the German mineralogiſts in their uſual rage for unmeaning ſlang, had aſſigned the name *pech blend*, blind zinc. Klaproth in 1789 aſcertained that this mineral conſiſts chiefly of ſulphur combined with a peculiar metal, to which he gave the name of uranium, from the name which the German aſtronomers had aſſigned to the Georgium ſidus, the new planet diſcovered by Herſchel. His diſcoveries were afterwards confirmed by Richter and Bucholz. The ores of this metal have been found ſince, in veins in primitive mountains, in Bohemia, Norway, Cornwall, and France. They are generally of a black colour, and ſometimes of a green, and contain, beſides ſulphur, a mixture of other metals and ſubſtances.

(2133.) As no proceſs has yet been invented for obtaining this metal in large quantity, we think it unneceſſary to detail the means which have been adopted to reduce it to its metallic ſtate. Nor is it certain whether it ever has been obtained in a pure ſtate. Its luſtre is conſiderable; its colour iron grey; it yields to the file; its ſpecific gravity, according to Klaproth; is 8·100, but Bucholz obtained it as high as 9·000. This is a deciſive proof that its purity is yet uncertain.

(2134.) When heated to redneſs in an open veſſel, it is ſoon changed into a greyiſh black powder which is its protoxide. This oxide conſiſts of

95·1	uranium,
4·9	oxygen.
100	

(2135.) When diſſolved in nitric acid and precipitated by an alkali; or when its precipitates from the ſulphuric and muriatic acids are expoſed in a moiſt ſtate to the air, its peroxide is obtained, which is yellow, and inſoluble in water. This oxide is ſuppoſed to contain from 76 to 80 parts of uranium combined with from 24 to 20 of oxygen. But Bucholz thinks this metal is at leaſt capable of combining with 6 dozes of oxygen, as he obtained oxides which were

Greyiſh black,
Dark grey inclining to violet,
Greeniſh brown,
Greyiſh green,
Orange,
Lemon yellow.

(2136.) As this metal has never been obtained in quantity, nothing is known reſpecting the alloys it forms with other metals.

(2137.) The oxides of uranium combine with acids; and all we know reſpecting its ſalts is derived from Klaproth, Richter, and Bucholz. The diſtinguiſhing property of theſe ſalts is that they are moſtly ſoluble in water, and that their ſolution has a yellow colour. A few of them may be mentioned.

I. Sulphate of Uranium.

(2138.) This ſalt is eaſieſt formed by boiling diluted ſulphuric acid upon the peroxide of uranium. By extremely ſlow evaporation, the ſolution yields cryſtals of a beautiful yellow colour. According to Bucholz, this ſalt conſiſts of

18 acid
70 oxide
12 water
———
100

II. Nitrate of Uranium.

(2139.) The nitric acid diſſolves uranium with emiſſion of nitrous gas. But this acid more readily diſſolves the oxide, without emiſſion of gas. The ſolution has a yellow colour, and as this ſalt is extremely ſoluble in water, the beſt way to cryſtallize it is to expoſe it to very long and ſlow evaporation by a very moderate heat. When the acid is ſaturated with oxide the cryſtals are lemon yellow, tinged with green at the edges. When there is a ſlight exceſs of acid they have all a greeniſh colour. They are in the form of tables, often hexagonal; ſometims they are obtained in large four-ſided rectangular flat priſms. Theſe cryſtals are reckoned the moſt beautiful of all the metallic ſalts. They are ſtill more ſoluble in alcohol than in water, and this ſolution, by ſlow evaporation, yields regular cryſtals. Theſe cryſtals deliqueſce in damp air, and fall to powder where the air is heated to about 100°. By greater heat the acid is expelled, and the ſalt decompoſed. According to Bucholz this ſalt contains

61 oxide
25 acid
14 water
———
100

III. Muriate of Uranium.

(2140.) The muriatic acid ſcarcely acts upon uranium, but it diſſolves its oxide, and forms a ſalt which cryſtallizes in four ſided tables, and, is deliqueſcent.

(2141.) The other ſalts of Uranium do not ſeem to require particular notice. But as the oxide of uranium ſeems capable of being procured in greater quantity from its ores, than the metal itſelf, it may poſſibly be uſefully employed to colour glaſs, or to paint porcelain or enamels; or being mixed with other oxides, to convey various ſhades of colour to theſe elegant products of art and ſcience.

Sect. XXIV. Tungsten.

(2142.) A mineral is found in Sweden, of a white colour, which had obtained the name of *tungſten, ponderous ſtone*, on account of its great weight. In 1781, Scheele aſcertained that it was compoſed of lime, and an earth-like ſubſtance having acid properties, to which he therefore gave the name of *tungſtic acid*. Bergman conjectured this acid to have a metallic baſis; and D'Elhuyart having obtained the ſame acid from a mineral known in Germany by the name of *wolfram*, ſucceeded in reducing it to the metallic ſtate, to which, he gave the name of tungſten.

(2143.) The ores of tungſten have only been found in the primary mountains, and they generally accompany ores of tin. They occur in Germany, Sweden, Cornwall, France, and Spain. Only two ſorts of them have been diſcovered, *Oxides*, and *Tungſtate of lime*. The oxides have obtained the name of *wolfram*, and always accompany ores of tin. They are either maſſive or cryſtallized, of a dark greyiſh or browniſh black colour.—The tungſtate of lime is commonly maſſive, but ſometimes cryſtallized. Its colour varies from yellowiſh or greyiſh white to ſnow white. Theſe ores contain the oxides of iron and of manganeſe, and ſome other ſubſtances, as well as the oxide or acid of tungſten.

(2144.) To reduce the ore the tungſtic acid is mixed with charcoal powder, and expoſed to the moſt violent poſſible heat in a covered crucible The metal forms a congeries of ſmall globules, ſome of which are as large as a pin-head. But to reduce this metal to complete fuſion, a heat generated by a ſtream of oxygenous gas ſeems neceſſary.

(2145.) Tungſten, thus obtained, has much brilliancy, with the colour of iron. Its ſpecific gravity is 17·6, and it is next to gold and platinum in denſity. It is very brittle, though among the hardeſt of the metals. It ſeems to cryſtallize on cooling.

(2146.) Heated in an open veſſel it attracts oxygen, and is converted into an oxide. It is capable of forming two oxides, the *black*, and the *yellow*.—The *yellow*, or *peroxide*, alſo known by the name of *tungſtic acid*, (ſee 872) occurs native in the mineral called wolfram, and may be obtained by boiling three parts of muriatic acid on one of the mineral, the acid to be decanted in about half an hour, when it gradually depoſits a yellow powder. This powder is to be diſſolved in ammonia, the ſolution evaporated to dryneſs, and the maſs expoſed ſome time to a red heat. The yellow powder which remains is the oxide in a pure ſtate. Tho' not ſoluble in water, it remains long ſuſpended in it, ſo as to form a ſort of yellow milk. It has no acid properties (872) and is compoſed of

80 tungſten
20 oxygen
———
100

The black oxide may be obtained by heating the yellow oxide ſome hours in a covered crucible, which expels part of its oxygen.

(2147.) Tungſten combines with ſulphur and phoſphorus. The Elhuyarts tried to combine tungſten with various metals; but unleſs this metal could be reduced in greater quantity, and more completely fuſed, no practical advantage is likely to reſult from its alloys. The difficulty of reducing tungſten, and of obtaining it in quantity, have alſo prevented its ſalts from being examined, and they remain wholly unknown. But as the oxid might eaſily be procured, it might be worth while to try its effect in colouring glaſs, and in enamel painting.

IV. Refractory Metals.

(2148.) Theſe conſiſt of metals that never have been fuſed, and, of courſe, never have been reduced to the metallic ſtate. They are therefore only known as oxides.

Sect. XXV. Titanium.

(2149.) In 1781 Mr Gregor diſcovered a black ſand in the valley of Menachan, in Cornwall, reſembling gun-powder, which he found to be compoſed almoſt entirely of iron and the oxide of a new metal, to which he gave the name of *menachine*, from the place where he found it. In 1795 Klaproth analyſed a browniſh red mineral, which mineralogiſts called *red ſhore*, and found it entirely compoſed of the oxide of a new metal to which he gave the name of *titanium*. In 1797 he examined the black mineral diſcovered by Mr Gregor, and found it to be a compound of the oxides of iron and his titanium. But the name affixed by Klaproth has been retained, from his great celebrity. Neither of theſe chemiſts were able to reduce this oxide.

(2150.) The ores of Titanium have been found in various countries, chiefly in the primary mountains, or in alluvial earth. They are all reducible to one, namely the oxide, which mineralogiſts have laboured to perplex and confuſe, in their uſual manner, by aſſigning to them a variety of capricious names.—Lampadius is ſaid to have reduced the oxide, by mixing it with charcoal, and expoſing it to a very violent heat. That the colour of the metal is that of copper, but deeper. That it oxidizes when heated, and aſſumes a blue or purple colour, and detonates when thrown into a red hot nitre. Another oxide is of a red colour, occurs native, and is the oxide on which Klaproth operated. Its higheſt oxide is white, and may be formed by fuſing the red oxide in four times its weight of potaſh, and diſſolving the whole in water. A white powder ſeparates, which is the white oxide of titanium. It conſiſts of 11 parts oxygen, combined with 89 parts of red oxide.

(2151.) Titanium does not combine with ſulphur, but Mr Chenevix ſucceeded in combining it with phoſphorus It does not combine with other metals, as far as is yet known.—The acids ſeem to act chiefly on the carbonate of titanium, which is formed by melting one part of red oxide, and ſix of carbonate of potaſh in a crucible, waſhing the maſs with water, which leaves a white powder This is the carbonate of titanium, and conſiſts of

75 white oxide
25 carbonic acid
———
100

The oxides of this metal have not been tried in colouring glaſs, or enamel painting.

Sect. XXVI. Columbium.

(2152.) This metal was diſcovered by Mr Hatchett in 1802 in a mineral belonging to the Britiſh Muſeum, which had been ſent to Sir Hans Sloane, among various ſpecimens of iron ores from Maſſachuſetts, and which he had deſcribed in his catalogue as "A very heavy black ſtone with golden ſtreaks." By a very ingenious analyſis, Mr Hatchett aſcertained that this mineral conſiſted of one part of oxide of iron, and rather more than three parts of a white ſubſtance which proved to be an acid with a metallic baſis.—For the properties of this acid we refer to (890, 891, &c. &c.) He proved that this acid differed from all the other metallic acids, and of courſe inferred that its baſis muſt be a peculiar metal, to which he gave the name of *columbium*, in honour of the original diſcoverer of the weſtern continent. All attempts however, to reduce this acid to the metallic ſtate, failed though it was reduced to the oxide ſtate; and as the quantity of the mineral he had to operate upon was ſmall, and no more of it has yet reached Europe, we deem it unneceſſary to enter into a detail of Mr Hatchett's very ingenious experiments concerning it, or into the combinations of its oxides with acids.

Sect. XXVII. Tantalium.

(2153.) Two minerals have been long known in the pariſh of Kimito in Finland. The one has a bluiſh or blackiſh grey colour, metallic luſtre, and compact fracture, great hardneſs, and ſpecific gravity 7·953. The other occurs in ſmall kidney form maſſes of a deep grey colour, metallic luſtre, little hardneſs and granular fracture. Its ſpecific gravity is 5·130. From both theſe minerals Mr Ekeberg, an eminent Swediſh chemiſt, has lately extracted a white powder, which he aſcertained to be the oxide of a peculiar metal; to which, becauſe the oxide refuſed to combine with acids, he has aſſigned the name of *tantalium*, alluding to the fable of Tantalus' cup. He was not able to reduce this oxide into the metallic ſtate. But it combines with the two fixed alkalies, forming compounds ſoluble in water. When fuſed with phoſphate of ſoda, and borax, it forms colourleſs glaſſes.

Sect. XXVIII. Cerium.

(2154.) In 1750 a mineral was diſcovered in the copper mine of Baſtnas, in Weſtmannland in Sweden, which, from its weight, was ſome time confounded with *tungſten*. Various examinations had been made of this mineral at different times, by eminent chemiſts, who adopted contradictory opinions concerning it. At laſt Hiſinger and Berzelius, two Swediſh chemiſts, ſubjected it to a more rigid examination, and diſcovered in it a peculiar ſubſtance which they affirmed to be a metallic oxide. To this diſguiſed metal they gave the name of *Cerium*, from the name *Ceres* which Piazzi had choſen to affix to the new planet lately diſcovered by him. All attempts to reduce this oxide to the metallic ſtate, have hitherto proved abortive. The oxide is firſt of a white colour, but after being heated to redneſs, it becomes cinnamon brown. But it is capable of various degrees of oxidizement, and its different degrees are marked by being white, yellow, red, and dark brown. That theſe changes are owing to combination with oxygen, ſeems manifeſt, becauſe when muriatic acid is digeſted upon its oxides, a part of it flies off in the ſtate of oxymuriatic acid gas. Vauquelin has reduced theſe various degrees of oxidizement to two.

—The protoxide of a white colour, and the peroxide of a reddiſh.

(2155.) The oxides of cerium combine with all the acids, forming *ſalts of cerium*. The general properties of theſe ſalts are,

1. That their colour is either white, or yellow, according to the extent to which their baſis is oxidized.

2. Their ſolutions have a ſweet taſte.

3. Hydroſulphuret of potaſh precipitates the white oxide of cerium. Sulphureted hydrogen occaſions no precipitate.

4. Pruſſiate of potaſh cauſes a milky precipitate, which is ſoluble in nitric and muriatic acids.

5. Oxalate of ammonia produces a white precipitate, which is inſoluble in nitric and muriatic acids

6. No precipitate is occaſioned by gallic acid, or infuſion of nutgalls.

(2156.) As the mineral from which oxide of cerium is extracted has only yet been found in one mine, we deem it unneceſſary to enter into a minute deſcription of its ſalts.—Perhaps this oxide, were it found in ſufficient abundance, might be advantageouſly employed in colouring glaſs, and in enamel painting.

(2157.) In the preceding parts of this work, we have dwelt chiefly upon thoſe ſubjects which were known to be of practical utility, or which we thought might be rendered uſeful in practice. In the many things we have omitted, we would not wiſh it ſhould be underſtood that we meant to inſinuate that they were of no uſe; but that their uſe was not at preſent aſcertained. In a treatiſe of this ſort, which profeſſes to exhibit a ſummary of the preſent ſtate of chemiſtry, a ſubject ſo vaſt, and on which facts and diſcoveries are accumulating more rapidly than it is poſſible to arrange and methodize them, we are obliged to confine ourſelves to thoſe facts which may ſerve to illuſtrate the principles of the ſcience, or which may appear capable of being carried into practical effect.

SOAPS.

(2158.) We reſerved the conſideration of theſe compounds until all the ſubſtances were diſcuſſed which enter into their compoſition. Soaps are formed by the union of a fixed oil with a baſis. The baſe which combine with oils, are either alkalies, acids, earths, or metallic oxides. The ſoaps are diſtinguiſhed from each other by their baſes. Thus we have *alkaline*, *acid*, *earthy*, and *metallic ſoaps*. We learn from Pliny that ſoaps were firſt invented by the ancient Gauls, or Germans. Olive oil is eſteemed the beſt for the fabrication of ſoaps; but tallow, butter, fiſh oil and a great variety of oils are employed with advantage. Chaptal, in place of oils, propoſed to combine old wool, and ſhreds of woollen cloth with the alkaline ley, and this practiſe has been proſecuted in France with conſiderable ſucceſs.

I. ALKALINE SOAPS.

1. SODA OR HARD SOAP.

(2159.) The diſtinguiſhing property of ſoap which has ſoda for its baſis, is that it is commonly in a ſolid form, whereas that which is formed by potaſh is always in a ſoft or gelatinous ſtate.

(2160.) To prepare this ſoap, the ſoda of commerce, or kelp, are firſt rendered *cauſtic*, or have their carbonic acid abſtracted from them, by being mixed in powder with lime newly ſlacked and ſifted. (See 1285). This mixture is made in a large wooden vat, and the lime is commonly in the proportion of a fifth of the weight of the ſoda. But the quantity of lime neceſſary depends much upon its own purity, compared with the purity of the alkali on which it is to operate. The veſſel is now filled with water, ſo as to cover the mixture to a conſiderable depth. The lime abſtracts the carbonic acid from the ſoda, and the water becomes charged with pure alkali. After this water has remained ſeveral hours, it is drawn off by a ſtop-cock, and is called the *firſt ley*. A ſecond and third quantity of water is added, and after remaining a ſufficient time on the mixture, they are drawn off, and are called the *ſecond* and *third leys*. To make certain that all the ſoda is diſſolved and drawn off, a fourth quantity of water is poured in, and is reſerved for making the firſt ley of a future operation.

(2161.) A quantity of oil, or tallow, equal to about ſix times the weight of the ſoda employed, is now put into a boiler, with a quantity of the *third* or *weakeſt ley*. The maſs being brought to boil, is perpetually ſtirred with a long wooden lever. The whole of the *third* and *ſecond* leys are added at intervals. The oil combines with the alkali and becomes milky. When it acquires a certain conſiſtence, a little of the firſt or ſtrongeſt ley is added, and the whole is conſtantly ſtirred. As the ſoap forms, it begins to ſeparate from the watery part of the liquid, which is much facilitated by adding a portion of common ſalt. The boiling and agitation are ſtill continued for about two hours, when the fire is withdrawn, and the whole allowed to remain at reſt. After ſome hours, the ſoap ſeparates completely from the liquid part, and ſwims on the ſurface. The liquid is now drawn off, and as it contains carbonate of ſoda it ſhould be reſerved for future uſe. A little weak ley is now added, and the maſs is brought to boil again, with conſtant ſtirring. During this operation the remainder of the firſt ley is added at intervals. A little of the ſoap is taken out from time to time, and allowed to cool, by which it is judged when the ſoap arrives at the proper conſiſtency. When this happens the fire is withdrawn, and the watery part drawn off as before. It is now heated again with a little water, and brought to the conſiſtence of a ſoft paſte; when it is poured into wooden boxes, or moulds, where it conſolidates. Thoſe boxes have a little powdered chalk upon their bottoms, to prevent the ſoap from adhering. They come aſunder in pieces, and the ſoap is cut into bars either by a ſtring or wire drawn acroſs it.—Soap made with ſoda and tallow is of a white colour, and is uſually called *white* ſoap. But they often uſe a mixture of roſin among the tallow, which gives it a yellow colour, and this forms the common yellow ſoap of this country.

(2162.) Soap is ſoluble both in water and in alcohol. Manufacturers often keep it in ſalt water, which increaſes its weight without diſſolving the ſoap. The different proportions of water contained in ſoap have occaſioned much diverſity in its analyſis. The following is the analyſis of newly made ſoap, according to Darcet, Selievre, and Pelletier.

60·94 oil,
8·56 alkali,
30·50 water.
———
100

2. Potash or soft Soap.

(2163.) The proceſs of making ſoap with potaſh is preciſely the ſame with ſoda, and need not be repeated. Potaſh ſoap never acquires a higher degree of conſiſtency than hog's lard, and it is hence uſually called *ſoft ſoap*, and ſometimes *black ſoap*. This ſeems to have been the only kind of ſoap known to the ancient Gauls, ſince it is deſcribed as an unguent. In this country ſoft ſoap is uſually made from whale oil, and a ſmall quantity of tallow being mixed with it occaſions thoſe white ſpots which are reckoned ornamental. It has preciſely the ſame effects with hard ſoap, only it is not ſo manageable. It is commonly kept in ſmall open caſks under a ſhed, for ſome time after it is made, as it is thought to improve by age, and expoſure to the air.—Some have pretended to make hard ſoap by means of potaſh, which is done by boiling ſoft ſoap with common ſalt. The potaſh in this caſe decompoſes the common ſalt, unites with its acid, while the ſoda of the ſalt combines with the oil, forming hard ſoap. But this is a ſoap of ſoda, not of potaſh.

3. Soap of Ammonia.

(2164.) The ſoap of ammonia, or vol-alkaline ſoap, may be formed by pouring a ſolution of muriate of ammonia, or ſal ammoniac, into a ſolution of common ſoap in water. A mutual decompoſition takes place, and the vol-alkaline ſoap floats on the ſurface like oil. The *volatile liniment* which is applied externally in rheumatiſms, colds, &c. is chiefly compoſed of this ſoap. Sir John Dalrymple, having directed a ſtream of cauſtic vol-alkali through ſolutions of ſoap in water, found a conſiderable proportion of this alkali combined with the ſoap; that it rendered ſoft ſoap hard, and very much increaſed the ſtrength of the ſoap with which it was combined.

(2165.) The diſtinguiſhing property of all the alkaline ſoaps is ſolubility in water and alcohol, and their great uſe, in the arts as detergents, in the cleaning of clothes.

II. Acid Soaps.

(2166.) The acids combine chiefly with the volatile oils, forming compounds which have obtained the name of *acid ſoaps*. Thus when oil of turpentine is very ſlowly dropped into four times its weight of ſulphuric acid, and ſtirred at each addition, a brown ſolution is formed. If this be thrown into three or four times its weight of water, and gently heated, a brown maſs ſeparates, of the conſiſtence of ſoft wax, which is acid ſoap. This ſoap is ſoluble in water and alcohol, it lathers like the alkaline ſoaps; but none of the acid ſoaps ſeem to be permanent combinations, and never have been applied to uſe. (See 1178.)

III. Earthy Soaps.

(2167.) The earthy ſoaps differ from the preceding in being all inſoluble in water. Hence they cannot be uſed as detergents, though ſome of them ſeem capable of being uſed as white paints. They may all be formed by mixing a ſolution of any earthy ſalt with a ſolution of alkaline ſoap. The acid in the ſalt combines with the alkali in the ſoap, forming a new ſalt; while the oil in the ſoap combines with the earth which the acid has quitted. Hence all waters which contain earthy ſalts in ſolution, are unfit for waſhing, as they decompoſe ſoap. Such waters are commonly called *hard waters*. The principal earthy ſoaps which Berthollet examined, are thoſe of lime, formed by pouring lime-water into a ſolution of common ſoap, of barytes, of ſtrontian, formed in the ſame way. Theſe reſemble each other in almoſt every reſpect. They are white, melt with difficulty, and are inſoluble in water and alcohol. The ſoaps of magneſia and of alumina are formed by mixing ſolutions of the ſulphates of magneſia and of alumina, or alum, with ſolutions of common ſoap.

IV. Metallic Soaps and Plasters.

(2168.) The metallic oxides combine with oils, and when the union is effected by double affinity, the products are called *metallic ſoaps*. When the oil is directly combined with the oxide, the products are called *plaſters*.—The metallic ſoaps are all inſoluble in water, and Berthollet warmly recommends ſome of them to be uſed as paints, and others as varniſhes. All the metallic oxides that are capable of forming ſoluble compounds with acids, are alſo capable of forming ſoaps with oils. The colour of theſe ſoaps is various, and hence they may afford various colours, and mixtures of colour, when uſed as paints or varniſhes. We ſhall adduce an example or two by way of illuſtration.

(2169.) Soap of iron may eaſily be formed by mixing a ſolution of ſulphate of iron with a ſolution of common ſoap. The ſulphuric acid combines with the alkali of the ſoap, while the oil of the ſoap combines with the oxide of iron which the acid had quitted.—The ſoap of iron is of a reddiſh brown colour, tenacious, and eaſily fuſible. It is ſoluble in oil, eſpecially that of turpentine. When ſpread upon wood, it ſinks in and dries. Berthollet recommends this ſoap as a varniſh.

(2170.) In the ſame way *ſoap of copper* may be formed by mixing ſolutions of ſulphate of copper and of common ſoap. It is of a green colour, which hot alcohol deepens. Ether diſſolves it, and renders its colour more beautiful. It is ſoluble in oils, and gives them a beautiful green colour. *Soap of lead* may be formed from acetate of lead. It is of a white colour.—It does not ſeem neceſſary to purſue this ſubject through all the metallic oxides, all of which may be made to form ſoaps in the way here pointed out.

(2171.) Plaſters are ſpread upon cloth or leather, and are intended to ſerve the purpoſe of artificial ſkin for external ſores. They ſhould be capable of adhering firmly to the ſore, be pliant and flexible, and capable of being removed without leaving any ſtain. The oxides of lead, and particularly *litharge*, have been chiefly employed in making plaſters. Some oxides, ſuch as thoſe of iron, do not form that combination with oils which conſtitutes plaſters. The drying oils, particularly that of linſeed, form the ſofteſt plaſters. But if olive oil be boiled with that of linſeed, it forms with litharge plaſters as ſoft as thoſe of linſeed. Deyeux prefers olive oil to all others for making plaſters.

(2172.) Plaſters are made by mixing the oil and litharge in proper proportions, and allowing them to remain a long time, with frequent ſtirring. They at laſt incorporate, but imperfectly; and this mode is ſeldom adopted.—Another method is to throw the oxide, in fine powder, into the oil while boiling, with violent agitation. But in this way there is always danger the oxide may be revived, and reduced to the metallic ſtate, before it can be incorporated with the oil.—The moſt uſual method is to boil the oxide and oil in a ſufficient quantity of water, to prevent exceſſive heat until they have combined. When this takes place the water is boiled off, and the plaſter reduced to a proper conſiſtency (1174.)

PART V.

NATURAL CHEMISTRY.

(2173.) The preceeding parts of this work exhibited a view of thoſe chemical proceſſes, and their reſults, which have been invented, or are, at leaſt, modified and conducted, by human genius and art. What follows has for its object to offer a ſuccinct view of thoſe chemical proceſſes, and their effects, which are going on in the ſeveral departments of Nature, as far as they have been traced by human obſervation.

DIVISION VIII.

THE ATMOSPHERE.

(2174.) The atmoſphere is an inviſible and elaſtic fluid which ſurrounds the earth on all ſides, and extends to a great though an unknown depth. The weight of the atmoſphere is aſcertained by the torricellian tube, or barometer. It is found, at a medium, to preſs upon the ſurface of the earth with a force equal to about 14 pounds upon every ſquare inch; and were we to calculate the number of ſquare inches on the earth's ſurface, we might acquire ſome idea of the weight or preſſure of the whole atmoſphere upon the ſurface of the earth.

The term *air* was long employed to denote by far the greateſt part of the elaſtic fluids of which the atmoſphere is compoſed, without including watery vapours, and other ſubſtances which are often mixed with the atmoſphere. To denote the permanently elaſtic fluids the term *gas* was afterwards ſubſtituted. In this diſcuſſion we ſhall employ the term air, meaning thereby *common* or *atmoſpheric* air.

(2175.) When the barometer is at 30 inches, and the thermometer between 50° and 60° the ſpecific gravity of air is 1·000. It is 816 times lighter than water, and a 100 cubic inches of it weigh 31 grains troy. But as air is an elaſtic fluid the ſtratum next the ſurface of the earth is compreſſed by the whole weight of the incumbent atmoſphere. Hence the lower ſtratum of air is denſer than the one above it, and its denſity diminiſhes as the height above the ſurface of the earth is encreaſed. It has been aſcertained that the denſity decreaſes in a geometrical progreſſion, while the heights increaſe in arithmetical progreſſion, and on this law is founded the meaſuring of heights by the barometer.

The blue colour of the ſky is owing to vapours mixed with the air, which reflect the blue rays. Sauſſure aſcertained that the farther we aſcend in the air, the darker the ſky appears; and if we could get above the region of vapours entirely, it would appear black, or wholly free of colour.

(2176.) By the ancients air was reckoned a ſimple or elemtary body. In 572, &c. we ſtated that air is compounded of azote and oxygen, in certain proportions, and what was there advanced need not here be repeated. The inſtrument by which the proportion of oxygen gas in the compoſition of air is aſcertained is called *eudiometer*, or meaſurer of the purity of air. Several plans have been adopted for this purpoſe, and they all conſiſt in preſenting to the air ſome ſubſtance which may combine with its oxygen, and cauſe it to diſappear. The diminution of bulk in the volume of air that is examined, marked by a graduated glaſs tube indicates the proportion of oxygen that has been abſtracted, and the quantity of azote remaining. For this purpoſe Dr Prieſtley employed nitrous gas, which combines with oxygen gas, forming red fumes, that are ſoon abſorbed by water. Having introduced into a graduated glaſs tube a certain number of meaſures of the air to be examined he next let up a certain number of meaſures of nitrous gas. The diminution of bulk marked on the graduated tube, the quantity of oxygen gas that exiſted in the air under examination. But this mode was liable to uncertainty chiefly owing to the difficulty of procuring nitrous gas in a ſtate of perfect purity.

(2177.) Scheele employed a mixture of iron filings and ſulphur, made into a paſte with water which abſorbs all the oxygen gas from a given portion of air. But the abſorption is ſlow, and ſulphuret of lime or potaſh was found to abſorb the oxygen in a few minutes. Thus a ſulphuret prepared by boiling ſulphur with lime water or potaſh being put into a bottle, into which is afterwards introduced a meaſured quantity of air from a tube graduated to 100 parts, cloſed with a glaſs ſtopper, and the air agitated among the liquid ſulphuret, the oxygen combines with ſulphur and converts it into an acid. The remaining air is then returned to the graduated tube, that its diminution of bulk may be aſcertained.

(2178.) Volta propoſed to accompliſh this object by the exploſion of hydrogen gas mixed with a certain portion of air, in a glaſs tube, by means of the electric ſpark. The oxygen and hydrogen are converted into water, and the quantity of oxygen is calculated from the diminution of bulk occaſioned by the formation of water.

(2179.) Achard firſt propoſed the combuſtion of phoſphorus in air, and Berthollet has brought this method to a ſtate of perfection by employing the ſlow combuſtion of phoſphorus. He employs a ſmall graduated glaſs tube containing the air to be examined, and inverted over water. A bit of phoſphorus is puſhed up through the air on the end of a glaſs tube, and is moved up and down ſo as ſoon to come in contact with all the air in the graduated tube. White vapours of phoſphoric acid are formed, which ſoon fall down and combine with the water. When all the oxygen has combined, there remains azote diſtended $\frac{1}{40}$th of its bulk by combining with phoſphorus. Allowance being made for this, the diminution in the bulk of the air expreſſes the proportion of oxygen which has been abſtracted from it. This laſt appears the moſt accurate of all the inſtruments employed. According to obſervations made with it in various and remote parts of the world, it appears that the compoſition of the air does not vary as was at firſt ſuppoſed, but that it uniformly contains

21 parts in bulk oxygen gas,
79 azotic gas.
——
100

Or 100 parts of air are compoſed by weight of

22·91 oxygen
77·09 azote
——
100

(2180.) The eudiometer only ſhews the proportion of oxygen gas exiſting in the air, by converting it into an acid, and mixing it with the water over which the experiment is made. It does not ſhew the proportion of other gaſes which enter into the compoſition of air, becauſe theſe are not in the leaſt affected by the ſubſtance preſented to the maſs of air, and which only combines with the oxygen. In order to conduct theſe experiments with accuracy, it is neceſſary that the barometer ſhould be always at its mean altitude; that the temperature ſhould be always the ſame; that the bottom of the air in the eudiometer tube ſhould be exactly at the ſame elevation with the water in the pneumatic trough; for if the tube be ſunk ſo that the ſurface of the air it contains be below the ſurface of the water in the trough, it is evident the air in the tube will be condenſed by the amount of the preſſure of the column of water which overtops its baſe; and if there be a column of water in the eudiometer tube riſing above the ſurface in the trough, the air in the tube will be rarefied by the amount of that preſſure. If all theſe particulars cannot be adjuſted ſo as to correſpond exactly, it is veary eaſy to calculate the variations in the preſſure of the atmoſphere in altering the denſity of air, the effect of variations of temperature, or of compreſſion or dilatation in conſequence of the air being preſſed upon, or ſuſtaining columns of water.

(2181.) The carbonic acid gas, after its diſcovery by Dr Black, was long ſuppoſed, on account of its ſuperior weight, to ſink into the lower regions of the atmoſphere, or into caverns and pits below ground. This ſeems to be the caſe when it is ſuddenly evolved, before the mutual attraction which ſubſiſts between it and the other gaſes of which air is compoſed, begins to operate. But no part of the air has been found where this gas is not preſent, which is manifeſt by its rendering lime water turbid, and ſlips of paper dipped in pure alkalies capable of effervеſcing with acids. Sauſſure, by theſe teſts, diſcovered this gas at the top of Mount Blanc, the higheſt point of the old continent, and which is covered by perpetual ſnow. The ſame gas has been found in air which was reached by balloons, perhaps at a much higher elevation than Mount Blanc, whoſe ſummit is 15,668 feet above the level of the ſea.—According to the experiments of Mr Dalton, the proportion of carbonic acid gas in the air does not much exceed $\frac{1}{1000}$th part. Were only one tenth of the air compoſed of this gas, it would prove fatal to animal life. When we conſider the immenſe quantities of it which are perpetually projected into the air, from various cauſes, it appears ſurpriſing that it does not acquire a noxious accumulation. But this we muſt aſcribe to its decompoſition by vegetables, which deſtroy it as faſt as it is evolved, and ſubſtitute oxygen gas in its place, by which the proportion between the reſpirable and the deleterious gaſes is kept in a ſalutary balance.

(2182.) It is certain that hydrogen gas is daily projected into the air, from various ſources. Carbureted hydrogen gas is alſo emitted in large quantities, during hot weather, from marſhes and ſtagnant waters. What becomes of theſe gaſes after they mix with the air, we have no means of knowing. Some think that hydrogen gas, from its lightneſs, mounts up towards the ſummit of the atmoſphere, and that the northern lights are maſſes of this gas kindled by the electric ſpark; which forming water, deſcends in rain or ſnow.—From what was ſtated (575) it is probable that all the gaſes, of which the atmoſphere is the grand reſervoir of our globe, form a ſort of chemical ſolution, or homogenious compound.

(2183.) Another kind of matter ſometimes exiſts in the air, which is diſtinguiſhed by the name of *the matter of contagion*, becauſe it communicates fatal diſeaſes to thoſe who come within its reach. It is ſuppoſed to be exhaled from putrid bodies, and is ſometimes diſtinguiſhable by its diſagreeable ſmell. Many experiments have been tried with a view to deſtroy this matter of contagion. The only effectual ſubſtances that have been found are acetic acid, the fumes of nitric acid, and muriatic acid gas. But the moſt powerful agent of any is oxymuriatic acid gas, which was firſt propoſed by Mr Cruickſhanks, and is now employed with the greateſt ſucceſs in the Britiſh Navy and Military Hoſpitals.—To make it operate with effect, it is only neceſſary to mix two parts of common ſalt, with one of the black oxide of manganeſe in a ſtone baſon placed in the infected houſe or chamber, and then to pour upon the mixture two parts of ſulphuric acid. Or the oxymuriate of lime, which is ſold to the bleachers, if mixed with ſulphuric acid, will anſwer the ſame purpoſe. The fumes of oxymuriatic acid are let looſe, fill the whole apartment, and ſoon deſtroy the

the contagion. While this is going on it is neceſſary that the doors and windows ſhould be ſhut, and that perſons ſhould retire. Afterwards the doors and windows are thrown open, to expel the fumes, and the houſe, or appartment, is now free of infection.

(2184.) Theſe are all the gaſeous, or permanently elaſtic fluids, which are known to exiſt in the air. With regard to ſmoke, and other bodies which are daily projected into the air, if they be not gaſes they ſeem to form no combination with it, but to return again to the earth.

(2185.) But water exiſts in great quantity in the air, for, if we expoſe concentrated ſulphuric acid to the air, even when it is perfectly tranſparent, it gradually attracts as much water as increaſes its weight more than three times. The fixed alkalies, the muriate and nitrate of lime, and all deliqueſcent ſalts, alſo poſſeſs this property. Many animal and vegetable ſubſtances alſo abſorb water from moiſt air, and give it out again in dry air. From obſerving this fact, *hygrometers* have been conſtructed, to meaſure the quantity of moiſture contained in the air around them.

(2186.) The moſt ingenious of theſe inſtruments were conſtructed by Sauſſure and Deluc. The firſt employed a human hair, the laſt a very fine ſlip of whalebone, which are ſo adjuſted that their contractions and expanſions turn round an index. Theſe bodies contract by moiſture, and expand by drying. The ſcale is divided into 100°, and the point of extreme dryneſs is obtained by immerſing the inſtrument in air that had been dryed as much as poſſible by means of deliqueſcent ſalts, which is the commencement of the ſcale. It is then placed in air ſaturated with moiſture, which gives the termination of the ſcale.

(2187.) But theſe inſtruments are liable to be affected by the temperature, as well as by the moiſture or dryneſs of the air. Nor are we certain of having attained the point of abſolute dryneſs, when all the moiſture is abſtracted from air, which is the commencement of the ſcale.—For theſe reaſons we are diſpoſed to prefer the ingenious mode adopted by Profeſſor Leſlie, for aſcertaining the comparative moiſture of the air, by means of his *differential thermometer*, which we deſcribed (189).—He wraps a ſmall ſlip of wet paper upon the focal ball of his thermometer, and expoſes the inſtrument to the air. In time of rain, or thick fog, when the air is giving out moiſture, no effect enſues; and this is the point of abſolute wetneſs. But the air is always either giving out, or imbibing moiſture. When the latter is the caſe, the water is evaporated from the wet paper, which generates cold in proportion to the rapidity of the evaporation. Hence the air in the focal ball is contracted, and the coloured ſulphuric acid riſes towards it; while the ſcale on the oppoſite limb ſhews the degree of dryneſs of the air, or its difference from abſolute moiſture.

(2188.) An opinion was firſt ſtarted by Dr Hooke and Dr Halley that water exiſts in air in a ſtate of ſolution, like a ſalt diſſolved in water. In confirmation of this it was obſerved that increaſe of temperature increaſed the quantity of water which air is capable of holding in ſolution, and that the quantity is diminiſhed by cold. In this reſpect air was found to be analogous to all other ſolvents.

(2189.) But Mr Dalton has lately advanced a different opinion.—That water exiſts in air in a ſtate of vapour, or elaſtic fluid, which, while it retains this ſtate, is every way ſimilar to air itſelf. He obſerves that water riſes more rapidly in vapour in an exhauſted receiver, and fills the receiver, than it riſes in the open air. Hence it is alleged the evaporation of water is not ſolution in air, as it takes place moſt rapidly where there is no air.—Sauſſure has proved that evaporation takes place much more rapidly at great elevations where the air is rarefied, than in low ſituations where the air is much more denſe. But it is aſſerted that were evaporation only the ſolution of water in air, the reverſe ought to take place, and that ſolution ought to be moſt rapid where the greateſt quantity of the ſolvent was accumulated.—Spontaneous evaporation always generates cold, or caloric always enters into combination with the water which eſcapes. Hence it is inferred that water always enters into the atmoſphere in a ſtate of vapour, or in union with caloric.—Mr Dalton has ſhewn that water in air poſſeſſes the ſame degree of elaſticity that it would have in *vacuo*, at the ſame temperature.—From theſe reaſons it has been concluded that water exiſts in air in the ſtate of vapour, or elaſtic fluid. In this ſtate it combines with the air in the ſame way as one gas combines with another. The attraction of air for the vapour of water is ſo ſtrong, that it is very difficult, if it be even poſſible, to ſeparate them entirely. Dalton ſuppoſes that the medium quantity of vapour held in ſolution by the atmoſphere, may amount to about $\frac{1}{70}$th of its bulk.

(2190.) The electric fluid alſo exiſts in great quantity in the atmoſphere, and its motions ſeem powerfully to promote the circulations of ſap in vegetables, and of the fluids in animals. This is apparently the ſame with the galvanic fluid, and the late diſcoveries in galvaniſm ſhew that it can be put in motion in various ways that were not formerly ſuſpected.

(2191.) With regard to the nature of the electric fluid, philoſophers are ſtill in the dark. It is elaſtic and inviſible, and is only known to us by its motions, which are ſo rapid that they can ſcarcely be meaſured. It ſeems to be a highly combuſtible fluid, for when it paſſes through air it takes fire, and emits both light and heat. When it paſſes through oxygen gas confined in a glaſs tube, its light is ſo vived that the eye cannot behold it; and though the glaſs ſhould be coated over with wax, it becomes tranſparent. But when this fluid paſſes through a gas which is not a ſupporter of combuſtion, or through a vacuum, it emits neither heat nor light. The ſame thing happens if it paſs through a metallic rod ſufficient to diſcharge the whole quantity. But if a great quantity ſhould paſs through a ſmall wire, it is luminous, becauſe a part of it glides along the ſurface, and is inflamed by the air.—In theſe reſpects the electric fluid correſponds with other inflammable bodies.

(2192.) Thoſe who have made experiments on atmoſpherical electricity have obſerved that the air contiguous to our earth, is always, with a few tranſient exceptions, poſitively electrified, or is charged with an exceſs of the electric fluid. Now air being an electric, or *non-conductor* of electricity, one ſtratum charged poſitively muſt produce a ſucceſſion of negative and poſitive ſtrata, perhaps to the ſummit of the atmoſphere.

(2193.) This may account for a remark that has often been made.—That there is much more thunder diſcharged from one ſtratum of air into another, or flaſhes without audible noiſe, than what is actually diſcharged into the earth.—The author of this only witneſſed one caſe, when thunder diſcharged itſelf from the earth to the air. The diſcharge roſe and paſſed within a few yards of him, and, for a time, deprived him of ſenſation. In general the electric ſhock ſtrikes from the air to the earth.

(2194.) The air is electrified, 1. By friction. Different currents may often be ſeen in the air, ſometimes to the extent of three or four, moving in various directions. Theſe currents become electrified poſitively and negatively alternately, until the accumulation in one current becomes ſo great that it often ſtrikes into the other. The air is alſo electrified by rubbing on the ſurface of the earth or ſea. In this reſpect air is ſimilar to all other electrics. 2. By evaporation. The evaporation of water ſeems always to convey electric matter into the air, and it would ſeem that water is kept in its elaſtic ſtate by union with the electric fluid. Sauſſure has aſcertained that the electricity is much increaſed when the water is decompoſed, as when it is thrown upon a red hot iron. It is ſuppoſed that plants, and eſpecially trees, throw up at leaſt a third more vapour into the atmoſphere, than would be evaporated from the ſame extent of watery ſurface that is occupied by their roots. Hence trees muſt throw great quantities of electric fluid into the air. But they alſo conduct back any exceſs of the electric fluid, and by robbing the air of that portion of electricity which is neceſſary to keep the water they throw up in its elaſtic ſtate, they occaſion clouds and rain. It is well known to the Weſt India planters that if they do not keep a ſufficient number of trees upon their eſtates, they need not expect a ſufficient quantity of rain to nouriſh their crops. The trees throw up water and the electric fluid, impelled by the heat of the ſun, and the abſorption of moiſture by the atmoſphere. When this cauſe is counteracted, they bring both back again to the earth. Hence all woody and marſhy countries are much colder than thoſe which are cleared and drained, becauſe in theſe countries cold is perpetually generated by exceſſive evaporation, while the air is rendered cloudy, and intercepts the rays of the ſun, by the exceſſive moiſture projected into it. Hence alſo all well cultivated countries are warmer, in the ſame latitude, than thoſe which are barren and unſubdued. Hence alſo hedge-row trees around corn fields, which ſeems to be the rage in England, ought to be wholly extirpated.—Air is alſo electrified by heat and cold; by expanſion and contraction; and by the freezing and ſolution of various bodies in contact with air.

(2195.) Mr Headrick, during ſeveral years, tried experiments on atmoſpherical electricity in the pariſh of Cambuſlang and other places near Glaſgow. He never erected his apparatus, in ſummer or winter during ſnow or rain, or when the air was perfectly limpid and tranſparent, but he found a ſtrong and ſteady current of the electric fluid from the air towards the earth. On a very few occaſions, the current ſtopped for about a ſecond, and then was for a very ſhort time negative, or roſe from the earth towards the air. But this happened ſo ſeldom as not to deſerve notice.—It appeared to him that the ſtrength of the electric current, or the quantity of the fluid diſcharged, was always in proportion to the extent of conducting ſurface expoſed to the air. Upon this obſervation he propoſed to conſtruct electrical ſpires, covered with thin boards gilded, or coated with tin-foil, ſupported on a central poſt like the maſt of a ſhip, and the whole completely inſulated. Such a building, he flattered himſelf, would draw ſuch a conſtant and powerful current of the electric fluid from the air, that it would be ſufficient to put in motion cotton mills, or other machines which require the greateſt power. It would put man in poſſeſſion of a new power, and render the thunders the miniſters of his wants.—But electricity is only introduced here as connected with the atmoſphere. (See ELECTRICITY.)

(2196.) Another ſet of bodies are occaſionally dropped from the atmoſphere, which have obtained the name of *meteoric ſtones*, or *meteoric iron*. For a long time philoſophers diſregarded, or ridiculed, the teſtimony of thoſe who affirmed they had actually ſeen ſuch ſtones fall from the air. But at laſt they were induced to examine the facts, and it ſeems now to be generally underſtood that the facts are put beyond the reach of contradiction. Theſe ſtones are always diſcharged by thoſe meteors called *fire-balls*, *fiery-dragons*, &c. which conſiſt of a large globular body emitting a vivid white light, followed by a waving or crooked tail, whoſe predominant colours are dark red or purple.

(2197.) When philoſophers were at laſt convinced that theſe ſtones were dropped from the air, they ſuppoſed they had been ejected from volcanos. But volcanos could not have given them a much farther range than a powerful mortar; and their being found at ſuch immenſe diſtances from any known volcano appeared utterly to ſubvert any ſuch opinion. Beſides, on chemically examining the ſtones themſelves, it was found that no ſuch ſtones exiſt in the neighbourhood of volcanos. The next opinion was that theſe *fire-balls* were ſmall ſattellites moving round our earth, whoſe centrifugal force not being ſufficient, they had got within the earth's atmoſphere, which retarded their motion, and brought them down to the ſolid ſurface. Had this been the caſe, theſe bodies muſt have been ſeen to perform many revolutions round the earth even after they came within the upper and rarer parts of its atmoſphere, before they deſcended to the lower and denſer regions, where their motion would ſoon be retarded, and they would be brought to the ground.—Beſides, theſe meteors do not ſhine from light borrowed from the ſun, moon, or earth. They appear to be great bodies of the electric fluid, moving from one part of the air to another, like ſparks from the poſitive to the negative ſide of an electric machine, and ſet on fire by the oxygenous gas through which they paſs.—The next opinion was that theſe ſtones were projected from volcanos which Mr Herſchel has diſcovered to abound in the moon. It is needleſs to expatiate on the irrationality of ſuch an opinion. The opinion which now generally prevails is, That theſe ſtones are concretions formed in the air, by a conſolidation of gaſeous fluids, produced by the rapid motion of a great maſs of electric matter through theſe fluids.—In (558) we pointed out the way in which the electric fluid cauſes gaſes to unite, and to form a liquid; and it does not ſeem at all improbable that the ſame fluid, acting in other circumſtances; may combine gaſes into ſolids of various deſcriptions. Indeed it ſeems not improbable that the moſt ſolid parts of our earth originally exiſted in the gaſeous, or elaſtic ſtate.

(2198.) When theſe ſtones firſt fall they are always hot, and emit a ſulphureous ſmell. They vary in ſize from a few ounces to ſeveral tons. They are covered with a black cruſt, which conſiſts of oxide of iron. Internally they are of an aſh-grey colour, interſperſed with greyiſh brown grains, with martial pyrites of a reddiſh yellow colour, and with grains of metallic iron. Theſe ingredients are all cemented by a ſoft earthy ſubſtance, ſo that they can eaſily be ſeparated and the ſtone crumbled in pieces. The proportion and ſize of theſe different ingredients vary in different ſtones; but all of them bear a ſtriking reſemblance to each other. Their ſpecific gravity varies from 3·352 to 4·281. Stones of this ſort, which fell in diſtant parts of the world, have been analyſed by the ableſt chemiſts, and have all been found to contain nearly the ſame ingredients, though in different proportions. Theſe are iron, nickel, oxide of iron, ſulphuret of iron, ſulphur, ſilica, magneſia, lime and mangancſe rarely.—A maſs of meteoric iron of 90 cubic feet, fell in America, April 5th 1800. There are very large maſſes of it in South America, in Siberia, and in different parts of China. Prouſt, Howard, and Klaproth have aſcertained that the maſſes of meteoric iron alluded to, reſemble the iron found in the meteoric ſtones, in containing a proportion of nickel in its compoſition. Klaproth has ſhewn that this is not the caſe with real native metallic iron, which never contains any nickel.—The meteoric and the native iron are therefore clearly diſtinguiſhed from each other. But this ſubject is involved in ſo much darkneſs and uncertainty, that we content ourſelves with preſenting an outline of what has been obſerved concerning it.

(2199.) Clouds and dews are formed in the atmoſphere from two cauſes. 1. From cold coming after heat, 2. From the abſtraction of that exceſs of the electric fluid which keeps water in its elaſtic ſtate. Of the firſt we have an example of water being exhaled by warm ſunſhine during the day, and precipitated in dew in the cool of the evening. If the upper part of the air ſhould be very cold, the ſtratum heated by contact with the ſurface of the earth aſcends, while the cold air deſcends, and precipitates the dew in a frozen ſtate, or in the form of hoar froſt. When this happens in Spring or Autumn, the crops are blighted and deſtroyed. This only happens during a calm, for a breeze of wind carries along the cold air, and prevents its deſcent.

(2200.) When water is precipitated from its elaſtic ſtate in the higher parts of the air, it is called a *cloud*. When the cloud hovers on the ſurface of the earth, it is called *fog*, *miſt*, *haze*, and is known by various names. Theſe clouds are found to conſiſt of ſmall air-bubbles, or veſicles, like thoſe which boys form from ſoap-ſuds; having a portion of air included in a thin globular coating of water. Theſe veſicles are every way ſimilar to the drops of dew.

(2201.) Clouds may be often ſeen forming in the morning, in conſequence of cold, which the ſun's rays, when they acquire ſtrength, again diſſolve into limpid air. For cloudy vapour intercepts much of the heat and light of the ſun, which cauſes it again to reſume its elaſtic ſtate.

(2202.) Some have obſerved that when clouds are formed by precipitation from the air, their electricity is always negative. This chemiſts account for by ſuppoſing that the electric fluid enters into the compoſition of the water. They obſerve that when water is decompoſed, electric matter is evolved; and they think it re-enters into the compoſition of the water when it is again formed. But in this caſe there is no water formed. It only paſſes from an elaſtic and inviſible, to a liquid ſtate. Poſitive and negative electricity are merely relative terms; and it ſeems very probable that when a cloud is formed, the exceſs of electricity which kept the water in an elaſtic ſtate, paſſes either into the earth, or into a neighbouring ſtratum of air, by which the electricity of the cloud will appear negative when compared with that of ſurrounding bodies. From theſe circumſtances it would appear that clouds are formed, not only in conſequence of a diminution of temperature, but chiefly in conſequence of the eſcape of part of the electric fluid from a maſs of air, by which part of its water is rendered incapable of retaining its elaſtic ſtate. If the barometer be low, clouds diſcharge themſelves in rain, or in ſnow during winter. Snow is only a different ſpecies of hoar-froſt, dropped from a greater altitude than the region of dew.

(2203.) In (250) the principal ſource of winds, or currents in the air, was hinted at, namely, the great heat excited upon the earth's ſurface, and communicated to the air, by the vertical rays of the ſun in the torrid zone. It may to this be added, that the Sun and Moon muſt raiſe high tides in the atmoſphere, and produce currents of air following their courſe, as they do in the waters of the ocean. Between the tropics the winds are very regular, or the cauſes of their variation can eaſily be pointed out. But this is not the caſe in the temperate and frigid zones. There the winds are ſo irregular that to account for them, ſome ſuppoſe that great maſſes of the atmoſphere are occaſionally annihilated. Were a great maſs of hydrogen gas, mixed with oxygen gas, to be ſuddenly fired, as ſome ſuppoſe often takes place in the higher regions of the atmoſphere, water would be formed, and a violent current of air would ruſh from every point to fill up the vacuity. But it appears to us that many currents are occaſioned by the electric fluid puſhing forward great maſſes of air toward ſome conducting object where it may diſcharge itſelf. This is evidently the caſe before, and during, diſcharges of thunder. The wind varies from every point of the compaſs, owing to this cauſe. Diſcharges of thunder produce a great vacuity in that maſs of air from which they are diſcharged. The clouds ſerve as ſtepping ſtones for the electric fluid to paſs from the maſs of air to the earth. After a great quantity of this fluid is diſcharged, heavy rain, and ſometimes hail, or pieces of ice, fall to the ground. The air always becomes colder after thunder than it was before. How to account for this, and the formation of hail and ice, even in the torrid zone, by diſcharges of thunder we confeſs ourſelves entirely at a loſs. But it would appear that when thunder has been diſcharged from a maſs of air, its bulk is diminiſhed, and currents preſs in from all points to ſupply the vacuum. This compreſſes the cloudy, or veſicular vapour into drops of ſolid water, or rain, which falls to the ground. Rain, hail, and ſnow, ſeem alſo to be impelled towards the earth by the elaſtic force of the electric fluid, and to ſerve the purpoſe of conductors to diſcharge the exceſs of this fluid from the air, and to convey it towards the earth. If an electrical conductor be expoſed to rain, hail, or ſnow, at any time ſummer or winter, whether there be thunder or not, while the other end of the rod is inſulated, and kept dry under cover, a powerful ſtream of the electric fluid is always found to accompany theſe ſhowers.

(2204.) We have thus preſented a ſhort view of the different ſubſtances which have been diſcovered in the compoſition of the atmoſphere, with the probable mode of their chemical action on each other.—This department of nature may ſtill be regarded as a *terra incognita*, in exploring which we have no other lights but conjectures and a few analogies which may be fallacious. But the farther elucidation of this department belongs to another branch of this work. See METEOROLOGY.

DIVISION IX.

WATERS.

(2205.) In (540, &c. &c.) it was ſhewn that water is a compound of the oxygen and hydrogen gaſes, combined together in certain proportions. But from the uſes to which water is applied, or foreign ſubſtances which are combined with it, a threefold diviſion of water has been uſually adopted. It has been diſtinguiſhed 1 into *common water*, which is uſed for the dreſſing of food. 2. *Mineral water*, which flows from the ſtrata of the earth, and contains various ſubſtances in ſolution. 3. *Sea-water*, with which the ocean and ſeveral inland lakes are filled.

SECT I. COMMON WATER.

(2206.) Good water is tranſparent and colourleſs, without ſmell, and has ſcarcely any taſte. The lighter it is, it is always eſteemed the better. Common water is divided into 1. Rain water; 2. Spring and river water; 3. Well water; 4. Lake water.

(2207.) Rain water, when collected at a diſtance from the ſmoke of Towns, is generally the pureſt of any ſpecies of common water. It holds in ſolution *air*, *carbonic acid*, *carbonate of lime*; and Bergman found it to exhibit ſome faint traces of *nitric acid*, and of *muriate of lime*. Boyle firſt obſerved the exiſtence of air in water, and Scheele found this air contained a greater proportion of oxygen than common air. Good water contains about $\frac{1}{28}$th of its bulk of air; and about $\frac{1}{100}$th of its bulk of carbonic acid gas. Theſe elaſtic bodies convey to water its taſte, and when expelled from it by boiling, the water becomes vapid and nauſeous. Fiſhes do not live in water formed from newly melted ſnow, and, as formerly obſerved, cattle which are obliged to drink this water ſoon die, becauſe water parts with its elaſtic contents before it freezes. The proportions of carbonate of lime, and of muriate of lime, in rain water, muſt be extremely minute. If ſtony ſubſtances be really formed in the atmoſphere, it is likely they may be in greater proportion at ſome than at other times. By evaporating great quantities of rain water at different times, and examining the ſolid ſubſtances depoſited, it is probable ſome light might be thrown upon this ſubject.

(2208.) Spring water is only rain water which deſcending through fiſſures of the earth, again erupts to the ſurface. Unleſs it meets with ſome ſoluble body in the ſoil, or ſtrata through which it paſſes, it is equally pure with rain water. But as this very ſeldom happens, there is found in the pureſt ſpring water, beſides the uſual proportion of air and carbonic acid, ſome carbonate of lime and common ſalt. Muriate of lime, and carbonate of ſoda, are alſo occaſionally found. But it ſeems unneceſſary to enter into a detail of ſpring waters, becauſe each ſpring contains ingredients derived from the ſoil and ſtrata through which it paſſes.

(2209.) River water, being a collection of ſpring and rain water, is generally purer than the former, as it depoſits in its progreſs the ingredients which had been mechanically ſuſpended, and only retains the uſual proportion of air and carbonic acid gas, with a ſmall quantity of carbonated lime and common ſalt. Rivers which run over beds of clay, alſo ſuſpend ſome of this ſubſtance, and are hence muddy. The water of lakes is ſimilar to that of rivers and ſprings, but uſually contains a greater proportion of animal and vegetable ſubſtances diſſolved in it. Marſh water contains a ſtill greater proportion of theſe ſubſtances. Moſs water contains an infuſion of thoſe plants of which moſſes are compoſed. When cattle are reduced to the neceſſity of drinking water from moſs holes in dry ſeaſons, it often proves fatal to them; but, after the ſame water has run a conſiderable way from the fountain, it becomes harmleſs. The late Captain Cook aſcertained that water impregnated with moſs never putrifies though kept ever ſo long at ſea. Mr Headrick found that when a ſmall quantity of lime water is dropped into moſſy water, the lime combines with the moſſy matter, and carries it to the bottom, leaving the water limpid and pure. He therefore propoſed to ſupply ſhipping with moſſy water; and if the rolling of the ſhip ſhould not allow the moſſy matter to depoſit, it might be ſeparated by filtration.

(2210.) Well water is obtained by digging pits in the earth, and is eſſentially the ſame with ſpring water. But this water often contains a proportion of earthy ſalts derived from the ſtrata through which it oozes, and is hence called *hard water*, becauſe it does not diſſolve, but rather decompoſes ſoap, and is unfit for the dreſſing of ſeveral kinds of food. The ſame obſervation is applicable to the water which iſſues from an immenſe variety of ſprings. The moſt common of theſe ſalts are ſulphate of lime or of alumina, or ſulphate of magneſia. Carbonate of lime is alſo frequent in hard water. When ſoap is preſented to ſuch water, the acid combines with the alkali, while the earth combines with the oil, forming an inſoluble compound. A little of the carbonate of ſoda or of potaſh dropped into ſuch water, decompoſes the earthy ſalts, and renders the water fit for waſhing Well water is alſo diſtinguiſhed by the name of *pump water*, becauſe it is commonly drawn from the pits, or reſervoirs, where it is collected, by means of pumps.

Sect. II. Mineral Waters.

(2211.) Mineral waters are ſuch as differ in colour, taſte, and ſmell, from all other waters, and are ſeldom applied to the purpoſes of domeſtic economy It frequently happens that theſe ſprings are warmer than the medium temperature of the earth, and ſome of them are even of the boiling temperature. They have been reſorted to in all ages for the cure of various diſeaſes, and in certain external eruptions, and internal diſorders, ſome of them have been productive of good effects. The late Dr Irvine of Glaſgow was of opinion that it is the water, when taken internally, which effects the cure, by purifying the maſs of blood; and that the mineral ſubſtances with which it is combined only ſerve as ſtimulants to make the water paſs more readily into the ſyſtem.

(2212.) The proportion of mineral ſubſtance which occaſions the peculiar properties of mineral waters, being often very ſmall, and the ingredients being often various, few problems in chemiſtry are attended with more difficulty than the accurate analyſis of mineral waters. Mr Boyle firſt aſcertained the exiſtence of air in theſe waters, and pointed out certain teſts by which their ſaline ingredients might be conjectured After the diſcovery of carbonic acid by Dr Black, much progreſs has been made in the analyſis of mineral waters. The diſſertation on the analyſis of mineral waters publiſhed in 1778, by the illuſtrious Bergman, formed a new era in this branch of chemical inquiry. The ſubject has ſince received much illuſtration from the labours of Giſannetti, Black, Klaproth, Weſtrum, Fourcroy, Breze, Kirwan, and other eminent chemiſts.

(2213.) Mineral waters are commonly divided into

1. Acidulous,
2. Chalybeate,
3. Hepatic or ſulphureous,
4. Saline.

(2214.) The acidulous waters commonly owe their properties to carbonic acid. They redden the tincture of turnſole, and precipitate lime water. They have a ſharp acid taſte, ſparkle when poured into a glaſs, boil readily, and emit air bubbles by agitation. They generally contain ſome common ſalt, and a portion of ſome earthy carbonate.

(2215.) Chalybeate waters contain iron which is held in ſolution by carbonic acid. Hence ſuch waters depoſit ochre by expoſure to the air, or by boiling, which cauſes part of the acid to fly off. Theſe waters ſtrike a black colour with tincture of nutgalls, or with infuſion of tea. Sometimes the acid is in exceſs, which is the caſe with the waters of Spa and Pyrmont, and then they are both chalybeate and acidulous. Sulphate of iron rarely occurs in chalybeate waters, and when this is the caſe the water ſtrikes a black colour with tincture of nutgalls after it is boiled, which is not the caſe when carbonate of iron only is preſent.

(2216.) Hepatic or ſulphureous waters contain ſulphureted hydrogen gas. They are diſtinguiſhed by the ſmell of ſulphureted hydrogen which they exhale, and by their blackening ſilver and lead. They often depoſite ſulphur, in the form of a yellowiſh white powder, in the courſe of the rill which flows from them. Sometimes the ſulphureted hydrogen is only combined with the water, ſometimes it is united to lime or an alkali. Theſe waters frequently contain carbonic acid, and uſually ſome muriates and ſulphates.

(2217.) Saline waters contain ſalts in ſolution, and each ſalt conveys to them its peculiar taſte. When the ſalts are the carbonate or ſulphate of lime, or any other earthy ſalt, they are called *hard waters*, becauſe they decompoſe ſoap. When common ſalt predominates they are called *ſalt ſprings*, and like ſea water contain a proportion of magneſia and calcareous ſalts. When ſulphate of magneſia predominates, as in the ſprings at Epſom, the waters are bitter and purgative. Sometimes carbonate of ſoda predominates, and the waters are then called *alkaline*, and are diſtinguiſhed by their changing vegetable blues into green.

(2218.) The only ſalts hitherto found in mineral waters are the following.

1. *Sulphate* of ſoda
2. ammonia
3. lime
4. magneſia
5. alumina
6. iron
7. copper
8. *Nitrate* of potaſh
9. lime
10. magneſia
11. *Muriate* of potaſh
12. ſoda
13. ammonia
14. barytes
15. *Muriate* of lime
16. magneſia
17. alumina
18. manganeſe
19. *Carbonate* of potaſh
20. ſoda
21. ammonia
22. lime
23. magneſia
24. alumina
25. iron.
26. *Hydroſulphate* of lime
27 potaſh
28. Borax.

Sect. III. Analysis of Mineral Waters.

(2219.) The ingredients in mineral waters are firſt aſcertained by certain teſts, and afterwards their proportions are aſcertained by a more minute analyſis. It has been already ſtated that theſe ingredients are chiefly either *gaſeous*, or *ſaline*. Beſides theſe lime and other alkaline earths are occaſionally found in mineral waters. Bergman firſt obſerved ſilica, and Dr Black detected this earth in the hot ſprings of Geyzer and Rykum in Iceland. Kalproth found this earth in the waters of Carlſbad; Haſſenfratz in thoſe of Pougues, and Breze in thoſe of Pu. Silica has alſo been found in ſome of the ſprings which iſſue in the coal-pits of Swinridge Moore Airſhire, and in many other mineral waters. Bitumen, combined with an alkali, ſo as to form a ſoap, has been found in ſome waters. Extractive matter ſometimes occurs in others, though the latter ſeems to be accidental.

(2220.) In analyſing mineral waters, the nature of the ſtrata from which they flow ought firſt to be examined, as all waters derive their peculiar ingredients from theſe ſtrata. Next the colour, taſte, and ſmell of the water itſelf ſhould be examined, and its ſpecific gravity and temperature ſhould be aſcertained with all poſſible exactneſs. If it appears that the water contains gaſeous ingredients, a retort being filled about two thirds with the water, and boiled a ſhort time, the gas may be received in a jar over mercury. There its quality may be examined, and the proportion which its volume bears to that of the water from which it was ſeparated at a medium temperature. If the gaſeous ingredient conſiſt not of one, but of a mixture of gaſes, each of theſe may be ſeparated and their proportions aſcertained by the means which were deſcribed when treating of the gaſes.

(2221.) The ſaline ingredients in waters are either uncombined acids, or acids combined with a baſe in exceſs, or combined with a baſe to the point of ſaturation ſo as to form neutral ſalts. To ſhorten the inveſtigation of theſe, it may be neceſſary to premiſe that there are certain ſalts which cannot coexiſt in the ſame ſolution, becauſe they would mutually decompoſe each other, and form new compounds. Thus the following

Salts are	Incompatible with
1. Fixed alkaline ſulphates	Nitrates of lime and magneſia, Muriates of do do
2. Sulphate of lime	Alkalies, Carbonate of magneſia, Muriate of barytes,
3. Alum	Alkalies, Muriate of barytes, Nitrate, muriate, carbonate of lime, Carbonate of magneſia.
4. Sulphate of magneſia	Alkalies, Muriate of barytes, Nitrate and muriate of lime,
5. Sulphate of iron	Alkalies, Muriate of barytes, Earthy carbonates,
6. Muriate of barytes	Sulphates, Alkaline carbonates, Earthy carbonates.
7. Muriate of lime	Sulphates, except of lime, Alkaline carbonates, Carbonate of magneſia.
8. Muriate of magneſia	Alkaline carbonates, Alkaline ſulphates.
9. Nitrate of lime	Alkaline carbonates, Carbon. of magn. and alumina, Sulphates, except of lime.

(2222.) The preſence of acids, or of acids combined in exceſs, is diſcovered in the following manner. *Carbonic acid* is precipitated by lime water, and the percipitate is ſoluble, with effervescence, in the nitric, muriatic, acetic, and ſeveral other acids. It alſo conveys a fugacious red colour to the infuſion of litmus. The *mineral acids* convey a permanent red colour to the infuſion of litmus. *Sulphureted hydrogen gas*, which we have ſhewn to poſſeſs the properties of an acid, is known by its ſmell. It conveys a fugacious red colour to the infuſion of litmus and blackens paper dipped in a ſolution of acetate of lead, or of nitrate of ſilver. It alſo blackens theſe metals in their ſolid ſtate.

(2223.) *Alkalies* and *alkaline carbonates* are diſtinguiſhed by their conveying a brown colour to infuſion, or to paper ſtained with infuſion of turmeric, and by changing the infuſion of Brazil wood or paper ſtained with it, to a blue. They alſo reſtore litmus paper, which had been reddened by vinegar, to its original blue colour. The *earthy carbonates* produce the ſame effects upon infuſion of Brazil wood, and on litmus paper. When paper recovers its original colour by expoſure to the air it may be inferred that the alkali which produced the change was ammonia, or the volatile alkali. The ſame remark is applicable to the volatile or gaſeous acids.

(2224.) The earthy and metallic carbonates are diſcovered by boiling the water containing them, which occaſions their precipitation in conſequence of expelling the exceſs of carbonic acid which cauſed their ſolution. The only exception to this is carbonate of magneſia, which is precipitated but imperfectly.

(2225.) The ſalts of iron are known by their exhibiting a blue precipitate with the Pruſſic alkali. But if an alkali be preſent in the water, it muſt be previouſly ſaturated with an acid, before the blue colour appears. Or martial ſalts may detected by their occaſioning a purple, or black precipitate with tincture of nutgalls.

(2226.) Sulphuric acid whether free or combined, is detected by its forming a precipitate with the diluted muriate, nitrate, or acetate of barytes, of ſtrontian or of lime, or with the nitrate or acetate of lead. Of theſe the muriate of barytes is the moſt powerful.

(2227.) Muriatic acid is detected by means of nitrate of ſilver, which forms a white cloudy precipitate when dropped into water which contains even a minute portion of muriatic acid.

(2228.) Boracic acid is diſcovered by means of acetate of lead, with which it forms a precipitate inſoluble in acetic acid.

(2229.) With regard to the earths, *barytes* is detected by its forming a white precipitate with diluted ſulphuric acid. *Lime* forms a ſimilar precipitate with oxalic acid. *Magneſia* and *alumina* may be precipitated by means of pure ammonia, which precipitates theſe and no other of the earths. The alumina may afterwards be ſeparated by boiling the maſs in pure potaſh, which diſſolves the alumina, and leaves the magneſia. *Silica* is detected by evaporating the water to dryneſs, and diſſolving the reſiduum in muriatic acid. This ſilica remains undiſſolved.

(2230.) But as theſe ſubſtances are commonly combined with acids ſo as to form ſalts, it is alſo neceſſary to aſcertain what are the particular ſpecies of ſalts which are formed. Mr Kirwan has enabled us to accompliſh this difficult taſk by means of teſts.

(2231.) The *ſulphates* which are found in water are ſeven. Of theſe the *ſulphate of copper* is only found in the water which iſſues from ſome copper mines.

(2232.) *Sulphate of ſoda* may be detected by evaporating the water to one half, and adding lime water as long as any precipitate falls. In this way all the other earthy ſulphates will be precipitated except that of lime. This again will be precipitated by concentrating the liquid, then adding a little alcohol, and after filtration a little oxalic acid. With the water thus purified mix ſolution of lime, and if a precipitate appears on adding a little alcohol, it is a proof that ſulphate of ſoda or of potaſh exiſt in the water. To decide which of the two it is, precipitate with acetate of barytes, filter and evaporate to dryneſs. Digeſt the reſidue in alcohol, and evaporate to dryneſs. If the dry ſalt be acetate of potaſh it will deliqueſce; but if it be acetate of ſoda it will effloreſce.

(2233.) *Sulphate of lime* precipitates on evaporating the water, and the precipitate requires 500 parts of water to rediſſolve it. The ſolution yields a precipitate with alcohol, with muriate of barytes, oxalic acid, and carbonate of magneſia.

(2234.) *Sulphate of alumina*, and *alum* may be detected by mixing the liquor with carbonate of lime, or muriate of lime, or muriate of magneſia, which produce a precipitate. If metallic ſulphates be preſent they muſt firſt be removed by means of the alkaline pruſſiates.

(2235.) *Sulphate of magneſia* occaſions a precipitate with hydroſulphuret of ſtrontian, provided the water be previouſly deprived of alum, if it be preſent, by means of carbonate of lime, and that no uncombined acids, not even the carbonic be preſent.

(2236.) *Sulphate of iron* is precipitated from water by alcohol.

(2237.) There are about eight or nine muriates found in mineral waters. Of theſe by far the moſt common is *muriate of ſoda*, or *common ſalt*. To detect this, and *muriate of potaſh*, firſt ſeparate ſulphuric acid by alcohol end nitrate of barytes. Then decompoſe the earthy nitrates and muriates by ſulphuric acid, and expel the exceſs of their acids by heat. Separate the new formed ſulphates cy alcohol and barytes water. If the water now forms a precipitate with acetate of ſilver it contains muriate of ſoda or of potaſh. Evaporate to dryneſs, and diſſolve the acetate in alcohol. Again evaporate to dryneſs, and if the ſalt effloreſce, it is acetate of ſoda; but if it deliqueſce it is acetate of potaſh.

(2238.) *Muriate of barytes*, the only barytic ſalt yet found in mineral waters, is detected by weak ſulphuric acid, by which its baſe is precipitated.

(2239.) *Muriate of lime* may be detected by concentrating the liquor, and adding ſulphuric acid which will precipitate the lime, and render the muriatic acid ſenſible. Or the water being depurated from any ſulphates it may contain, reduce its bulk by evaporation, adding ſpirit of wine, and laſtly nitrate of barytes as long as any precipitate appears. Filter, and evaporate to dryneſs. Add alcohol, and again evaporate to dryneſs, and diſſolve the reſidue in water. If the water is now mixed with carbonate of lime, and gives no precipitate with ammonia, it muſt contain muriate of lime.

(2240.) *Muriate of magneſia* may be detected by precipitating the ſulphuric acid by means of nitrate of barytes. Having filtered, and evaporated to dryneſs, add alcohol. Evaporate the alcohol ſolution to dryneſs and diſſolve the reſidue in water. If the water contained muriate of magneſia, it will be found in this ſolution, and may be eaſily known by its peculiar properties.

(2241.) *Muriate of alumina* may be detected by ſaturating the water, if it contain an exceſs of alkali, with nitric acid, and precipitating the ſulphuric acid by means of nitrate of barytes. If the water now gives a precipitate with carbonate of lime, it contains muriate of alumina.

(2242.) The *Nitrates* ſeldom, or never, occur in mineral waters. But if they ſhould occur their preſence may be detected by attending to the properties of this claſs of ſalts formerly explained.

(2243.) Having aſcertained the nature of the ſaline ingredients exiſting in mineral waters, the next point is to aſcertain the proportion they bear to the weight of water, and the relative proportion of the ſeveral ſaline ingredients towards each other.

(2244.) To ſolve the firſt of theſe problems, Mr Kirwan has pointed out a very ingenious method, which is never erroneous to the extent of more than two parts in the hundred.—The ſpecific gravity of the water being accurately aſcertained, and if it contains gaſes, theſe being previouſly expelled, ſubſtract the ſpecific gravity of pure water from the ſpecific gravity of the mineral water under examination (both expreſſed in whole numbers), and multiply the remainder by 1·4. The product is the ſaline contents in a quantity of water denoted by the number uſed to indicate diſtilled water. Thus let the mineral water be of the ſpecific gravity 1079, and the ſpecific gravity of diſtilled water 1000. Then $1079 - 1000 \times 1.4 = 110.6 =$ the ſaline contents in 1000 parts of the water under examination. Or 100 parts of the ſame water will contain 11.06 parts of ſaline matter.—For farther particulars relative to the ſolution of the ſecond problem, we muſt refer to Mr Kirwan's *Eſſay on the Analyſis of Mineral waters*.

(2245.) The annexed Table exhibits a view of the contents of the moſt celebrated mineral waters, which were analyſed by chemiſts of the firſt eminence.

		Gases. Cubic Inches.				Carbonates of			
	Water	Oxygen.	Carbonic acid.	Sulph. hydrog.	Azotic.	Soda.	Lime.	Mag.	Iron.
Seltzer . .	8949	·435	13·068	—	—	5·22	78·3	6·32	—
Spa . . .	8933	—	9 8	—	—	1·85	1·85	4·35	0·70
Pyrmont . .	8950	—	19·6	—	—	—	4·3	9 8	0·70
Aix la Chapelle	8940	—	—	13·06	—	15·25	5·98	—	—
Medvi . .	8933	—	6·53	8·71	—	—	—	—	0·92
Carlſbad . .	25320	—	50	—	—	38·5	12·5	—	0·1¼
Leming. Priors	5816	—	·5	—	3·5	—	—	—	·75
Pouges . .	9216	—	16·7	—	—	10 4	12·4	1·2	—
Enghien . .	92160	—	18·5	70·0	—	—	21·4	1·35	—
Lu . . .	36864	—	5·	2·	—	—	10·22	—	—
Geyzer . .	10000	—	—	—	—	0·95	—	—	—
Uhleaborg .	42250	—	10·	—	—	—	1·9	—	1·2
Tepliſz . .	22540	—	—	—	—	13·25	16·5	—	32·5
Kilburn . .	138240	—	84·	36·	—	—	2·4	1·25	·3⅛
Briſtol . .	103643	3·	30·	—	—	—	13·5	—	—
Tunbridge .	103643	1·4	10·6	—	4·	—	—	—	1·
Cheltenham .	103643	—	30·368	—	15·	—	—	—	5·
Harrowgate .	103643	—	8·	19·	7·	—	18·5	5·5	—
Moffat . . .	103643	—	1·	10·	4·	—	—	—	—
Bath . . .	15360	—	2·4	—	—	—	1·6	—	0·004

	Muriates of				Sulphates of					
	Soda.	Lime.	Mag.	Pot-aſh.	Soda.	Lime.	Mag.	Silica.	Au-min.	Re-ſin.
Seltzer . .	13·74	—	—	—	—	—	—	—	—	—
Spa . .	0·21	—	—	—	—	—	—	—	—	—
Pyrmont .	1·7	—	—	—	—	8·38	5·44	—	—	—
Aix la Chapelle	6 21	—	—	—	—	—	—	—	—	—
Medvi . .	—	0·11	—	—	—	—	—	—	—	—
Carlſbad . .	325·	—	—	—	66·75	—	—	2·25	—	—
Leming. Priors	43·0	—	11 5	—	15·2	112·	—	—	—	—
Pouges . .	2·2	—	—	—	—	—	—	3·2	0·35	—
Enghien . .	2·4	—	8·0	—	—	33·3	15·8	—	—	—
Lu . . .	36·74	9·25	—	—	—	14·03	—	0·23	—	—
Geyzer . .	2·46	—	—	—	1·46	—	—	5·4	0·48	—
Uhleaborg .	5·7	—	—	1	—	0·8	—	1·7	—	—
Tepliſz . .	61·3	28·5	—	—	—	—	—	15·1	—	—
Kilburn . .	6 0	0·6	12·8	—	28 2	13·0	91·0	—	—	
Briſtol . .	4·	—	7·25	—	11·25	11·75	—	—	—	—
Tunbridge .	0·5	—	2·25	—	—	1·25	—	—	—	—
Cheltenham	5·	—	25·	—	480·	40·	—	—	—	—
Harrowgate	615·5	13·	91·	—	—	—	10·5	—	—	—
Moffat . .	3·6	—	—	—	—	—	—	—	—	—
Bath . . .	6·6	—	—	—	3·	18·	—	0·4	—	—

(2246.) When extractive matter occurs in mineral waters, the ſulphuric and muriatic ſalts being previouſly precipitated by nitrate of lead, the extractive matter may be precipitated by means of nitrate of ſilver. The precipitate is of a brown colour, and three grains of it, according to Weſtrumb, contain one grain of extractive matter. Animal extractive matter conveys a very diſagreeable taſte and ſmell to water, and it is ſoluble in alcohol.

Sect. IV. Sea Water.

(2247.) The ocean is the grand reſervoir of water for our globe, from which water is ſupplied by evaporation to fertilize the earth, and which, having ſerved this purpoſe, is returned again in rains, dews, and rivers. The atmoſphere is the great medium of this circulation of water, which is perpetually going on, and thoſe parts of the earth to which it does not extend, are doomed to everlaſting ſterility. The ocean occupies about three fourths of the ſurface of the earth; but as its mean depth is unknown, the quantity of its water cannot be aſcertained. Mr De la Place demonſtrated that a depth of four leagues is neceſſary to reconcile the height of the tides in the main ocean with the Newtonian theory of the tides. If this be the mean depth, the quantity of water in the ocean muſt be immenſe. But ſuppoſing the mean depth only the fourth part of a mile, the quantity of water in the ocean would be 32,058,939½ cubic miles.

(2248.) Sea water near the ſurface, or along the ſhores, is diſtinguiſhed by its nauſeous bitter taſte. This is owing to animal and vegetable matters with which it is mixed, for when taken from a great depth its taſte is only ſaline. It has been a ſubject of diſpute whether the ſea be eſſentially ſalt, or if its ſalt be accidental and derived from rocks of ſalt in the bowels of the earth. It is alſo thought that the ſaltneſs of the ſea prevents the putrefaction of the animal and vegetable matters that are contained in it. But Sir John Pringle aſcertained that a ſmall proportion of ſalt promoted, inſtead of retarding, putrefaction. The lakes of Canada and other extenſive bodies of freſh water, are not known to putrefy any more than the ſea. Perhaps we are to look for the abſence of putrefaction from the ocean to its conſtant agitation. Dr Prieſtley obſerved that this rendered the air more reſpirable than it was before. Were the ſeas to putrefy, the deſtructive gaſes that would be exhaled would ſoon extinguiſh animal life.

(2249.) The ſpecific gravity of ſea-water varies from 1·0269 to 1·0285. It does not freeze until cooled down to 28·5° of Fahrenheit. The ſaline ingredients in ſea-water, as aſcertained by Bergman and other chemiſts, are muriate of ſoda or common ſalt, muriate of magneſia, ſulphate of magneſia, and ſulphate of lime. The average quantity of theſe ingredients is $\frac{1}{28}$. Water taken from the depth of 60 fathoms near the Canaries by Dr Sparrman, was found by Bergman to contain $\frac{1}{24}$ of ſaline ingredients. Water at the back of Yarmouth Sands was found by Lord Mulgrave to contain $\frac{1}{32}$ part. Bergman found water from the depth of 60 fathoms to contain the following ſalts, in the following proportions.

30·911 common ſalt
6·222 muriate of magneſia
1·000 ſulphate of lime.

Lavoiſier found 10,000 parts of ſea water on the weſt of Dieppe to contain

1375 muriate of ſoda
256 muriate of lime and magneſia
156 muriate of magneſia
87 lime
84 ſulphate of ſoda and magneſia,

being almoſt $\frac{1}{5}$ of ſaline contents, which appears to be an exceſſive proportion. Dr Thomſon found $\frac{1}{10}$th of ſaline contents in the water of the Frith of Forth.

(2250.) From the experiments of Bladh it would appear that ſea water contains more ſalt at the tropics than towards the equator. Though the proportions of ſaline matters doubtleſs vary in wet and dry ſeaſons, and muſt be leſs near the mouths of rivers than in the open ſea, yet theſe proportions have not been found to vary ſo much as was at firſt expected. Lord Mulgrave found water taken 60 fathoms under ice, in latitude 80° north to contain about $\frac{1}{28}$ of ſaline matter; in latitude 74° nearly the ſame; and in latitude 60°, $\frac{1}{29}$. Pages obtained 4 per cent. from water in latitudes 45° and 39° north. He alſo found the proportions in ſouthern latitudes to be as follow:—

Latitude.		Saline matter.
49°	50′ S.	0·0416
46	0	0·045
40	30	0·04
25	54	0·04
20	0	0·039
1	16	0·035

(2251.) Were water mixed with various proportions of the ſalts which are found in ſea water, in their relative proportion to each other, and the ſpecific gravity of each mixture taken, we might be enabled to aſcertain the ſaline contents in ſea water from its ſpecific gravity. This Dr Watſon attempted with a view to aſcertain the proportion of common ſalt; and as the ſalt he uſed contained a mixture of the ſalts found in the ſea, the reſult will not be far from the truth, as in the following Table, which is reduced to the temperature of 62°, by Mr Kirwan.

Propor. of Salt.	Spec. Grav. at 62°.
$\frac{1}{24}$	1·0283
$\frac{1}{25}$	1·0275
$\frac{1}{26}$	1·0270
$\frac{1}{27}$	1·0267
$\frac{1}{28}$	1·0250
$\frac{1}{30}$	1·0233
$\frac{1}{39}$	1·0185
$\frac{1}{44}$	1·0133
$\frac{1}{50}$	1·0105
$\frac{1}{108}$	1·004
$\frac{1}{161}$	1·0023

(2252.) Bladh conſtructed a Table of the ſpecific gravity of ſea water in different parts of the Atlantic and Indian oceans. His longitude is counted from Teneriffe. This Table Mr Kirwan has reduced to the temperature of 62°, and by comparing it with the preceding, the proportion of ſaline ingredients in various parts of the ocean may be ſeen.

Latitude.	Longitude.	Sp. Gr. at 62°.
North	East.	
59° 39′	8° 48′	1·0272
57 18	18 48	1·0269
	Weſt.	
57 01	1 22	1·0272
54 00	4 45	1·0271
44 32	2 04	1·0276
	Eaſt.	
44 07	1 00	1·0276
40 41	0 30	1·0276
34 40	1 18	1·0280
29 50	0 00	1·0281
	Weſt.	
24 00	2 32	1·0284
18 28	3 24	1·0281
16 36	3 37	1·0277
14 56	3 46	1·0275
10 30	3 49	1·0272
5 50	3 28	1·0274

LATITUDE.	LONGITUDE.	Sp. Gr. at 62°.
North.	West.	
2 20	3 26	1·0271
1 25	3 30	1·0273
South.		
0 16	3 40	1·0277
5 10	6 00	1·0277
10 00	6 05	1·0285
14 40	7 00	1·0284
20 06	5 30	1·0285
25 45	2 22	1·0281
	East.	
30 25	7 12	1·0279
37 37	68 15	1·0276

(2253.) Mr Wilke has ſhewn that the proportion of ſaline matter in the Baltic varies with the direction of the wind, and that its ſalts are derived from the ocean. A weſterly wind blows the waters of the ocean into the Baltic, and increaſes its quantity of ſalt. An eaſterly wind blows out the waters of the ocean and diminiſhes the proportion of ſalt; as may be ſeen by the following Table, which Mr Kirwan has reduced to the temperature of 62°.

Wind	*Specific gravity*
Eaſt	1·0039
Weſt	1·0067
Weſt, a ſtorm,	1·0118
North-weſt	1·0098

Hence it appears that with an eaſterly wind, the proportion of ſaline matter in the Baltic is only $\frac{1}{208}$th part, and that it is doubled by a weſterly ſtorm.

(2254.) Tournefort thinks the Euxine and Caſpian ſeas contain leſs ſalt than the ocean. The Dead Sea in Paleſtine is nearly ſaturated with ſalt, as it contains no leſs than 44·4 *per cent.* of ſaline matter. Its ſpecific gravity is 1·2403. According to the analyſis of Lavoiſier, it is compoſed of

55·60 water,
38·15 muriate of lime and of magneſia.
6·25 common ſalt.

We may account for this from the poſition of this ſea, or lake, being ſurrounded by an extenſive tract of impure mineral ſalt. There are extenſive lakes in Siberia and Tartary, ſituated in thoſe barren tracts called *Steppes*, whoſe ſtrata conſiſt of mineral ſalt. Some of theſe lakes are ſo much ſatured with ſalt that they depoſit great quantities of it during the dry ſeaſon. But no vegetables grow there except thoſe which are peculiar to the ſea, or confined to its ſhores.

DIVISION X.

MINERALS.

(2255.) Upon this branch of our ſubject we ſhall only remark, that there ſeems to exiſt a general conſpiracy to abſurdiſy abſurdity. It would be eaſy to contrive a new Nomenclature in Mineralogy, ſimilar to that now adopted in Chemiſtry, which would indicate not only the chemical compoſition of a mineral but its moſt uſual external appearance. It is well known that the chemical ingredients in a mineral uſually determine its external form. Unleſs Chemiſtry and Mineralogy be rendered inſeparable, no two people can underſtand each other when they ſpeak of minerals. But as the elucidation of this ſubject belongs to a ſeparate department of this work, we ſhall not enter upon it here.—See MINERALOGY.

DIVISION XI.

VEGETABLES.

(2256.) Vegetables form a very numerous claſs of bodies in nature, there being upwards of 40,000 ſpecies of them known to botaniſts and their known number is daily increaſing. The chief diſtinction between minerals and vegetables derives from their mode of increaſe, or growth. Minerals increaſe in ſize by ſimple aggregation, or appoſition of parts upon each other. Vegetables and animals are furniſhed with organs or veſſels, by which the matter which occaſions their growth is abſorbed and conveyed to every part of the plant or animal. They are alſo endowed with a living principle, by which they change the properties of the matter which enters into their organs, and convert it into the peculiar ſubſtances of which they are compoſed. In what the principle of life conſiſts, we do not know, and it is only known to exiſt from its effects.

SECT. I. PARTS OF PLANTS.

(2257.) A plant is compoſed of a root, ſtem, leaves, flowers, fruits, and ſeeds. When all theſe parts are developed the plant is ſaid to be perfect. When any of them are deficient, or leſs obvious, the plant is ſaid to be imperfect.

(2258.) The uſes of the root are to keep the plant firm by its ramifications through the ſoil, and to abſorb moiſture for its nouriſhment. Roots ſeem always to abſorb moiſture from their extremities, for if any of them be cut, the abſorption ceaſes, until new roots be projected to ſupply their place. When roots have abſorbed all the nouriſhment from a particular ſpot, they extend themſelves, and advance in queſt of more.

(2259.) The ſtem commences where the root terminates, and ſupports the branches and all the other parts of the plant. In large plants, ſuch as trees, it is called the *trunk*, and conſiſts of two parts, the bark and the wood. The bark, like the ſkin of animals, inveſts the whole plant from the points of the roots to the extremities of the branches. The bark is compoſed of three coats, the *epidermis*, which is a thin tranſparent covering inveſting the bark and is compoſed of fibres croſſing each other. When that is removed it grows again. The *parenchyma*, immediately below the epidermis, is of a dark green colour, ſucculent and tender, and is compoſed of fibres croſſing each other in all directions. The *cortical layers* conſtitute the interior part of the bark, are compoſed of thin membranes, and their number increaſes with the age of the plant. Theſe layers ſeem to graduate into wood, ſoft at firſt, but which hardens by age. It is certain that all increments of wood are made in concentric coats, ſo that what was a cortical layer the preceding year, appears to be converted into a coat of wood the year following.

(2260.) The wood under the bark, is compoſed of concentric coats, to which one is added every year, and theſe coats are compoſed of thinner layers, the whole conſiſting of longitudinal fibres. The longitudinal fibres are interſected by croſs cuts, or veins, generally in a diagonal direction, but which vary in every ſpecies of plant. The wood next the bark is ſofter and whiter than that towards the center of the tree, and is called *alburnum*, or white wood. The interior wood is browner and harder, and is called *perfect wood*, and ſometimes *red wood*.—The woody fibres of plants ſerve the ſame purpoſe to them that bones do to animals, and their formation bears a ſtriking reſemblance to the formation of bones.

(2261.) In the center of the ſtem the *pith* is ſituated. It is a ſoft ſpongy ſubſtance, compoſed of cells which have obtained the name of *utriculi*, or little bladders. This ſubſtance ſeems to ſerve ſome important purpoſe in the growth of young plants, for after trees acquire a certain age, it is gradually contracted in dimenſions, until at laſt it is converted into perfect wood. Many plants, in place of containing pith, are internally hollow tubes.

(2262.) In the ſtem, as well as in the roots and branches which project from it, are included many veſſels, with the nature and functions of which we are not yet acquainted.—But there ſeems to be two diſtinct ſets of veſſels, one of which conveys the ſap upwards from the roots to the leaves, where, after being elabourated by the action of the Sun's rays; it is returned along the branches, down the ſtem, even to the roots, and in its progreſs is expoſed to certain proceſſes analogous to glandular ſecretions in animals. The ſoap which riſes from the roots, ſeems analogous to the chyle, which is conveyed into the blood by the action of the abſorbent veſſels.

(2263.) What the veſſels are which convey the ſap from the roots to all parts of the plant, and to the leaves, has been a ſubject of much diſpute, nor does the controverſy ſeem to be yet decided. The ingenious Mr Knight is of opinion that the veſſels which perform this function are what are called *tracheæ*, air veſſels, which received their name from their reſemblance to the wind-pipe of animals. In tender plants theſe veſſels are always found in a ſpiral form, like wires twiſted round a cylinder. They are often of conſiderable dimenſions; but, as Mr Knight obſerves, unleſs they be examined the inſtant they are diſruptured, their ſap flows out, and they appear as hollow tubes. It is very difficult to diſtinguiſh them until after their ſap has eſcaped. They form ſpiral tubes penetrating every part of a plant from the roots up to the leaves.

(2264.) The next point upon which philoſophers are divided, is the power, or force, which cauſes the ſap to riſe in vegetables. That this power is very great, is evident from the experiments of Dr Hales, from which it appears that in the bleeding ſeaſon, when the ſap riſes with greateſt force in vegetables, the ſap from the cut end of a vine branch roſe with ſuch force as to ſuſtain a column of mercury 32½ inches high. This force could not be produced by the preſſure of the atmoſphere, as was long conjectured to be the cauſe of the riſe of ſap in vegetables, as it exceeded the general weight of the atmoſphere. Beſides the atmoſphere preſſes equally on all parts of a plant; and we cannot conceive a preſſure exiſting at the roots, which is not counteracted by a ſimilar preſſure on the branches and ſtem.

(2265.) It was next ſuppoſed that the ſap roſe through the appropriate veſſels by capillary attraction. This may account for its riſing a ſhort way in theſe veſſels; but to raiſe it to the top of a lofty tree, the veſſels muſt be ſo ſmall that no water could enter them. Beſides, were the ſap raiſed by capillary attraction, theſe tubes would keep what they had got, and there would be no emiſſion of their juice on making an inciſion into the plant, or on tearing it aſunder; which we know is not the caſe.

(2266.) Dr Thomſon ſeems to be of opinion that the ſap riſes through the veſſels called *tracheæ*; and in order to account for its riſe, he has recourſe to the principle of irritability. He ſuppoſes that when the juice enters the root, it produces an irritation which cauſes the mouths of the veſſels to contract; and as it advances it occaſions the contraction of ring after ring of the ſap veſſels, which prevents the return of what has paſſed a contracted ring, until the juice is forced to the top of the plant.—Were the ſap veſſels of plants furniſhed with valves, as is the caſe with the abſorbents and blood-veſſels of animals, this theory might account for the facts. But the contraction of theſe tubes, ſuppoſing it to exiſt, muſt defeat the purpoſe intended by its author. As ſoon as it is irritated, or exited by the contact of ſap, it muſt exclude any farther irruption of ſap from below, as well as preſs up what has eſcaped a contracting ring towards the ſummit of the plant. In fact this ſuppoſed contracting power of the veſſels is force againſt force, the one of which exactly counterballances the other.—That there are no valves in the ſap veſſels of plants ſeems manifeſt from this circumſtance, That when they are cut into fragments the ſap runs, with equal freedom; from the bottom of the fragment above, as from the top of the fragment below. There are alſo many plants whoſe branches being inſerted in the earth become roots, while their roots become branches; a fact wholly inconſiſtent with the notion of their ſap veſſels being furniſhed with a regular ſeries of valves which prevent the return of the ſap which had been forced upwards through theſe valves by the irritability and contraction of the veſſels below.

(2267.) On a ſubject ſo abſtruſe, and on which ſo few deciſive experiments have been made, our ſafeſt courſe is to plead *ignoramus*. But we may venture to remark that chemiſtry and phyſiology being chiefly proſecuted by men bred to medicine, while other claſſes of ſociety are either wholly indifferent, or regard theſe ſubjects as an amuſing ſhew, our phyſicians are too apt to ground their theories on feeble analogies, and to refer every thing in nature to ſome ſtandard eſtabliſhed in their medical claſs.—Thoſe who have ſurveyed nature on a great ſcale, unfettered by the trammels of a medical claſs room, have obſerved, that vegetables are the grand channel through which the electric fluid is circulated from the earth to the air, and *vice verſa*. Although they are not prepared to ſay how the electric fluid operates, they are inclined to think it performs an important function in impelling the circulation of fluids, not only in plants, but alſo in animals.

(2268.) That there are deſcending veſſels in plants, which convey juices downwards, as well as ſap veſſels which convey them upwards, is manifeſt from this circumſtance. If a tight ligature be put round any part of the trunk of a tree, ſuppoſing it to be a hoop of iron, the part of the trunk which is below the hoop never after increaſes in girth, while the part above receives annual increments of wood. From this it would ſeem that the veſſels which convey the ſap are deep ſeated, or perhaps riſe through all parts of the plant, while thoſe which return back the elaboutated juice are chiefly diſtributed near the ſurface of the plant. The veſſels which convey the ſap upwards are commonly called *lymphatics*, from a ſuppoſed reſemblance to that claſs of veſſels in animals. The veſſels which contain thick or coloured fluids are placed immediately under the bark, or are diſtributed through the bark; and ſometimes in the alburnum.

(2269.) The leaves of plants may be conſidered as an extenſion of the bark, and their intention ſeems to be to expoſe a greater extent of ſurface to the action of the air, and of the ſun's rays. The leaves perform many moſt important functions in vegetation, and they have been compared to the lungs of animals which elabourate the chyle into blood, which being returned to the heart, is projected through all parts of the ſyſtem.

(2270.) The ſap veſſels convey the ſap from the roots to the leaves of plants, where the firſt change it undergoes is having a very great proportion of it thrown off into the air by perſpiration. A ſprig of mint, weighing 27 grains, was found by Mr Woodward to imbibe 2558 grains of water in 77 days, while its weight was only increaſed 15 grains. It muſt therefore have thrown out 2543 grains. Other experiments have been made which eſtabliſh the ſame fact. But we ſhall only mention that Dr Hales found a cabbage perſpired daily nearly half its weight of moiſture, and a ſun-flower, three feet high, tranſmitted in a day 1 lb. 14 oz. avoirdupois. He found the tranſpiration was proportional to the ſurfaces of the leaves, and that when theſe were taken off it nearly ceaſed. He found that very little tranſpired during the night, that it was much promoted by heat, and ſtopped by rain and froſt. That tranſpiration is much promoted by ſunſhine, was proved by Millar, Guettard, and Sennebier. The quantity of moiſture which enters plants depends upon the quantity tranſpired; for when the veſſels are once full no more can enter unleſs to ſupply the waſte of what is tranſpired. Hales collected the tranſpired matter in large glaſs globes, and found it reſembled water, impregnated ſometimes with the odour of the plant. This liquid ſoon putrefied. Sennebier evaporated to dryneſs 60768 grains of liquid tranſpired from the vine during the months of July and Auguſt, and obtained 2$\frac{1}{2}$ grains of reſiduum, which conſiſted of $\frac{1}{4}$ grains of carbonate of lime, $\frac{1}{4}$ grains of ſulphate of lime, $\frac{1}{2}$ grain of mucilage, and $\frac{1}{2}$ grain of reſin.—The firſt great change produced upon the ſap when it arrives at the leaves, therefore, is the evaporation of the greateſt part of it. That this takes place chiefly at the upper ſurfaces of the leaves, appears from this, that if theſe ſurfaces be varniſhed, the evaporation is nearly ſtopped. The leaves become gradually unfit for diſcharging this function, and hence are renewed annually. Thoſe plants which retain their leaves during winter, tranſpire leſs than the deciduous plants.

(2271.) The next important function of the leaves is the abſorption of carbonic acid gas from the atmoſphere. For this diſcovery we are indebted to Dr Prieſtley. Dr Percival alſo publiſhed a ſet of experiments on this ſubject. It was found that plants immerſed in an atmoſphere of carbonic acid gas, ſoon changed it ſo as to render it capable of ſupporting the combuſtion of candles. But as the plants did not live long in this gas, it was concluded to be a poiſon, and not a food for plants. This ſeeming contradiction led Mr Henry of Mancheſter, Mr Sennebier, and Sauſſure junior, to examine the ſubject more minutely, and the following facts have been aſcertained.—Plants will not vegetate in pure carbonic acid gas, nor if their atmoſphere contain $\frac{3}{4}$ths of its bulk of that gas. They vegetate in the ſun's rays when their atmoſphere contains $\frac{1}{2}$, $\frac{1}{4}$th, or $\frac{1}{8}$th of that gas. When the atmoſphere contains only $\frac{1}{12}$th of carbonic acid gas, plants vegetate much better when expoſed to the ſun than in the open air. But when plants are in the ſhade, carbonic acid always injures, inſtead of promoting their vegetation. Plants will not vegetate in the ſun when totally deprived of carbonic acid gas. When put under a glaſs veſſel; they vegetate ſome time by alternately emitting and reabſorbing carbonic acid gas. But if quick lime be introduced, which abſorbs all the carbonic acid, the plants ſoon die. But in the ſhade plants vegetate better when deprived of all carbonic acid gas than when it is preſent.

(2272.) Dr Prieſtley firſt obſerved that if the green leaves of plants be put in water into an inverted glaſs jar, and expoſed to the ſun, they emit bubbles of oxygen gas, which can be collected in the upper part of the jar. Ingenhouſz and Bonnet extended theſe experiments, and found that pump water was more productive of oxygen gas than any other. Sennebier aſcertained that the quantity of oxygen gas obtained in this way, is in proportion to the quantity of carbonic acid contained in the water. That boiled water, which is deprived of all its carbonic acid, yields no oxygen gas. That after water has ceaſed to yield oxygen gas, it reſumes this proceſs after a portion of carbonic acid gas is added to it, and that water ſaturated with carbonic acid yields the greateſt proportion of oxygen gas.—It appears then that carbonic acid is abſorbed by the leaves, where it is decompoſed; the carbon being retained while the oxygen gas is thrown out. Sennebier proved that this proceſs takes place in the parenchyma; and Ingenhouſz aſcertained that it is performed by a certain ſet of organs. When he cut leaves into ſmall pieces, they ſtill emitted oxygen gas; but when their organs were deſtroyed by pounding them, they loſt the property entirely. Mr Headrick (ſee Eſſay on Manures publiſhed by the Board of Agriculture) found that the leaves of growing plants emitted no gas whatever when kept in total darkneſs. That they emitted a ſmall portion of conſiderably pure oxygen gas, when expoſed to the rays of the moon, or of a candle; and that leaves diſrupted from their parent ſtem, emitted chiefly carbonic acid gas, unleſs when they were ſtimulated by bright ſunſhine. He therefore drew a concluſion,—That all the obſervations of former experimenters where they found carbonic acid gas emitted by the leaves of plants, muſt have been cauſed by inſipient putrefaction in the leaves. That vegetation and putrefaction are oppoſite proceſſes, and where the one ceaſes the other commences. Sauſſure found that plants do not give out all the oxygen exiſting in the carbonic acid which they abſorb and decompoſe. A part ſeems to enter into the compoſition of the plant, and a portion of azote, or ſome other gas, is given out. The quantity of carbonic acid gas abſorbed varies much in different plants. The *lythrum ſalicaria* abſorbed ſeven or eight times its bulk of this gas in one day; while the *cactus opuntia* and other fleſhy leaved plants did not abſorb above a fifth of that quantity.

(2273.) It is very probable that plants derive the greateſt part of their carbonaceous matter from the carbonic acid which they abſorb and decompoſe when expoſed to light. Chaptal found that a byſſus which was vegetating in the dark, contained only $\frac{1}{86}$th of its weight of carbonaceous matter, but after vegetating in light for 30 days it contained $\frac{1}{24}$th of its weight of carbonaceous matter. Haſſenfratz found that plants growing in the dark contain much more water, and much leſs carbon and hydrogen than plants growing in the light. Sennebier found that their reſinous matter was to that of plants growing in light as 2 to 5·5, and their moiſture as 13 to 6. They alſo contained one half leſs of fixed matters. Plants only acquire a green colour when they vegetate in the light. Rouelle has ſhewn that the green colouring matter of plants is of a reſinous nature. From this, and from its being formed only in the light, Berthollet infers that water, as well as carbonic acid is decompoſed in the leaves of plants. He thinks the oxygen emitted is derived partly from the decompoſition of water, partly from that of carbonic acid, while the carbon and hydrogen enter into the compoſition of the inflammable parts of the plant.

(2274.) Plants abſorb a portion of oxygen gas during the night, and will not grow in an atmoſphere which is wholly deprived of this gas. It is probable that the combination of this gas tends to raiſe the temperature of the plant. It appears that oxygen is abſorbed by the roots as well as the leaves. It has alſo been aſcertained that the leaves abſorb water as well as the roots. In a great varity of plants water is abſorbed by the under ſide of the leaves; but in others it is abſorbed by the upper ſide.

(2275.) In conſequence of theſe decompoſitions, which only take place when the plant is expoſed to the action of light, there is formed what is called the *ſuccus proprius*, or peculiar juice of the plant. This bears a remarkable analogy to the blood of animals, and is adapted for being ſecreted by the proper veſſels, ſo as to enter into the compoſition of the plant. Thus the leaves may be regarded as the digeſting organs of plants, which like the ſtomach and lungs of animals, prepares the food for their nouriſhment. If the leaves be deſtroyed by inſects, the fruit never attains maturity, and if plants be repeatedly deprived of their leaves they die. Mr Knight has ſhewn that thoſe plants which drop their leaves in winter, have materials provided in the alburnum from which a new ſet of leaves may be formed at the return of ſpring. That the proper juice of plants is concocted in the leaves, appears from this, that if an inciſion be made in a plant, this juice flows moſt copiouſly from that part of the inciſion that is next the leaves, or branches, and this happens in whatever poſition the plant may be placed. There ſeems reaſon to ſuſpect that the veſſels which circulate this juice are furniſhed with valves. If ſhoots of gooſeberry and currant buſhes be planted in an inverted poſition, the upper part always decays. If a ring of bark be cut off all round a tree, Mr Knight found the veſſels of the alburnum acquired the property of tranſmitting the proper juice down to the roots, though its quantity is much diminiſhed, and the tree languiſhes and dies. That the proper juice, as well as the ſap, riſes when neceſſary, appears from this, that what is elabourated by the leaves of a depending branch, muſt riſe to the ſtem of the tree, before it can deſcend along the trunk towards the roots. This is an additional probability in favour of the veſſels which convey it being furniſhed with valves.

(2276.) The peculiar juice is known by its colour and conſiſtence. In ſome plants it is green, in ſome it is red, and in many it is milky. It is very difficult to obtain it ſeparate from the original ſap; but like the blood of animals, it ſeems to contain all the principles of which the vegetable is compoſed, prepared for uſe. Chaptal found in it matter reſembling woody fibre. It appears that every plant has a peculiar juice of its own, differing in its properties from thoſe of others. Hence the proceſs which goes on in their leaves muſt differ in degree, at leaſt, if not alſo in kind. But the whole of vegetation is involved in ſuch thick darkneſs that philoſophers have not yet been able to elicit a ſingle ray of light from the ſubject.

(2277.) The only parts of plants which ſtill remain to be conſidered, are what are called the *parts of fructification*. Theſe conſiſt of the flowers, which are compoſed of ſeveral parts. The *calyx* or cup is formed by an extenſion of the epidermis. The *corolla* or leaves of the flower, is a continuation of the bark. The *ſtamina* are the male organs of the flower, which are ſurmounted by the *antheræ*, which at a particular ſeaſon emit the *pollen*, or ſeminal powder. The *piſtilla* are the female organs of the flower, in which the ſeeds and fruits are formed in conſequence of being impregnated by the pollen. It ſeems that the leaves or petals of flowers perform the ſame function in the fructification, that the other leaves diſcharge in the growth of the plant. After the ſeeds are formed, or the fruit is ſet, as it is called, the petals of the flowers drop off.

(2278.) Fruits are generally compoſed of a pulpy, parenchymatous ſubſtance, encloſing the ſeeds in its center. A ſeed is compoſed of three parts, which have been called the cotyledons or lobes, the radicle, and plumula. Some farinaceous ſeeds, and thoſe of graſſes, have only one cotyledon. The greateſt number of ſeeds have two, others have three and ſome ſix. Hence plants have been diſtinguiſhed into *mono-cotyledenous*, *dicotyledinous*, and poly-cotyledinous.

(2279.) When a ſeed is put into a ſituation favourable to its germination, it ſwells in conſequence of abſorbing moiſture. The radicle projects downwards and becomes a root, while the plumula ſhoots upwards, generally carrying the ſkin of the ſeed upon its top, when it throws out one or more ſeed or ſeminal leaves. If theſe ſeed leaves be deſtroyed by inſects or other cauſes, the plant dies. Beſides moiſture, and a certain degree of heat, ſeeds will not germinate unleſs they have acceſs to oxygen gas, or to atmoſpheric air which contains it. Ray, Boyle, Muſchenbroek, and others, found that ſeeds would not germinate in the vacuum of an air pump. For the ſame reaſon they will not germinate at too great a depth below the ſurface of the earth. Scheele found that the preſence of oxygen gas is neceſſary for the germination of ſeeds. Achard found they would not germinate in azotic, hydrogen, or carbonic acid gas, unleſs theſe gaſes contained a mixture of oxygen. Humboldt aſcertained that ſeeds vegetate moſt rapidly after being ſteeped in oxymuriatic acid, or when watered with this acid, which freely parts with oxygen. At Vienna ſeeds which had been long kept, and which did not vegetate by any other means ſprung readily when treated with this acid. It has alſo been aſcertained that the abſence of light promotes the germination of ſeeds, and this is the reaſon why ſeeds are covered by the ſoil.

(2280.) During germination, oxygen gas is not only abſorbed by the ſeed, but carbonic acid gas is emitted. The quantity of carbonic acid emitted, ſeems to reſtore all the oxygen gas abſorbed. Hence a portion of carbon, or of farina, is extracted from the ſeed, and what remains is converted into ſugar and mucilage. Hence ſeeds after germinating to a certain extent, are found to be of a ſweet taſte, and from them, as from malt, for example, ſugar may be extracted by the uſual proceſs. The ſugar formed in the ſeeds of plants is underſtood to reſemble the milk ſecreted in the udders of female animals which alſo contains much ſugar. It nouriſhes the embryo plant until it can ſtrike its roots into the ſoil, and find nouriſhment for itſelf. The firſt effect of this formation of ſugar in the ſeed, is the extenſion of the radicle. The plumula ſeems to be connected only with the radicle, but not with the ſeed. As the former extends downwards, the latter riſes upwards, and after throwing out ſeminal leaves, the ſubſtance of which derive their nouriſhment from the ſeed, and which drop off after they are no longer neceſſary, the plumula continues to riſe and throws out other leaves and branches, which derive their nouriſhment from the ſoil and air, and no longer require any farther ſupply of food from the ſeed. In this way plants ſeem to reſemble certain claſſes of animals, which require to be nouriſhed by their mothers milk during a certain period; but after they can ſhift for themſelves, they loathe this ſpecies of food. It may alſo be ſeen that germination ſeems to be the reverſe of vegetation after the plant has germinated. The requiſites and the products of the one, are directly oppoſite to thoſe of the other.

SECT. II. FOOD *of* PLANTS.

(2281.) Having preſented an outline of the parts of plants, and the functions which each part performs; having ſhewn the probability that the germs which iſſue from ſeeds are nouriſhed from ſaccharine matter and mucilage formed or contained in the ſeeds themſelves, combined with water,—another queſtion of great difficulty occurs,—on what do plants feed after they have quitted their ſeeds; have thruſt their roots into the ſoil, and expanded their branches into the air?

(2282.) A ſatisfactory ſolution of this queſtion would be of the greateſt importance to agriculture; but it unfortunately happens that we are only able to offer a few random conjectures on a ſubject ſo intereſting to mankind. As no plant will grow without water, it was early ſuppoſed that water is the ſole food of plants. This opinion was zealouſly adopted by Van Helmont, Boyle, Bonnet, Duhamel, and Tillet. The celebrated Tull, the inventor of the drill huſbandry, was ſatisfied that water is the only food of plants, and that the ſoil only requires to be kept in a ſufficient degree of pulverization to allow their roots to travel in queſt of it. But it was found that perſeverance in his ſyſtem, without any addition of manures, at laſt rendered the land wholly unproductive; or in the language then in vogue, reduced it to a *caput mortuum*.

(2283.) We had formerly occaſion to ſhew the inconcluſiveneſs of Van Helmont's experiment; in raiſing a willow by watering it with rain or diſtilled water, without its abſorbing much weight from the earth in which it grew. The earthen veſſel in which his willow grew was unglazed, and hence his willow might have abſorbed juices through the pores of the veſſel, containing the ſubſtances which occaſioned its growth. Haſſenfratz, Sauſſure, and Duhamel, have ſhewn that plants will not arrive at maturity, nor ripen their ſeeds, if fed by pure water alone. So far is water from being the ſole food of plants, that few of them will thrive where it is in exceſs. Some plants grow conſtantly in water, while others would ſoon die in this ſituation. Rice requires a very wet ſoil, and would not grow where wheat grows luxuriantly: while wheat would ſoon rot in ground adapted for the production of rice.

(2284.) The wetneſs or dryneſs of a ſoil depends entirely upon the quantity of rain which falls upon it, and on the proportions of the earths which enter into the compoſition of the ſoil. If little or no rain falls, a ſoil muſt of courſe be dry whatever be the nature of its compoſition. Every ſoil contains ſilica in the form of ſand, alumina or clay, lime, and ſometimes magneſia. When the ſand is in exceſs, the ſoil is ſaid to be dry, becauſe it does not retain moiſture. When the clay is in exceſs, the ſoil is ſaid to be wet, becauſe it does not allow water to paſs through it; and it can only eſcape by running off, or by evaporation. Lime and magneſia are intermediate between theſe two. They increaſe the retentiveneſs of ſand, and diminiſh that of clay. Hence in dry ſeaſons and climates thoſe ſoils are moſt productive in which clay predominates, and in wet ſeaſons and climates, thoſe which contain a ſuitable proportion of ſand. In addition to theſe earths, ſoils contain the remains of animal and vegetable matters, which have grown ſpontaneouſly upon them, or have been conveyed in the form of manures. Thoſe ſoils are moſt fertile which contain the greateſt proportion of theſe matters; and thoſe which exhibit a conſiderable depth of black vegetable mold are the moſt fertile of any.

(2285.) It has been ſeen that plants derive a conſiderable proportion of their carbonaceous matter from the air. But it appears from numerous experiments that they derive a ſtill greater proportion of it from the ſoil, through the medium of their roots. Though charcoal may be diffuſed in water, ſo as to give it a dark brown colour, we do not know that it can be ſo completely diſſolved as to render it capable of entering the veſſels of plants. We are rather inclined to think that the carbonaceous matter in the ſoil, aſſiſted by heat, acts upon and decompoſes the water, producing carbonic acid, and carbonated hydroden gas. In this proceſs atmoſpheric oxygen, which penetrates the ſoil, muſt be ſuppoſed to contribute its ſhare. A well wrought, and highly manured ſoil, when acted on by the ſun's rays, commonly varies in temperature from 120° to 150°; while the heat of the air above it does not exceed 60°. In ſuch a ſoil, then, the water which eſcapes decompoſition muſt be ſo attenuated as to approach the ſtate of vapour, and it can be ſeen eſcaping from the ſoil in that ſtate. The ſoil ſeems capable of retaining a conſiderable proportion of theſe gaſes. and of water in a gaſeous ſtate; and there can be no doubt but in this comminuted form they can enter the ſmalleſt orifices of the veſſels of plants. It has been aſcertained that the moſt fertile ſoils for the production of cultivated plants, are thoſe which a given weight yields by diſtillation, the greateſt proportion of the carbonic acid and of the carbonated hydrogen gaſes or heavy inflammable air as it is commonly called. This fact ſeems to indicate that a chemical proceſs actually goes on in the ſoil by which theſe gaſes are generated.

(2286.) But beſides carbonaceous matter, other fixed ingredients are found in plants. Theſe are lime, magneſia, alumina, ſilica, and ſometimes oxide of iron and of other metals. It is a matter of much doubt whether theſe earthy ingredients be abſorbed from the ſoil, or if they be formed in the plant by the proceſs of vegetation. Lime has hitherto been ſuppoſed to promote vegetation indirectly by improving the texture of the ſoil. But as lime is ſoluble in exceſs of carbonic acid, if it be laid upon the ſurface of even hard paſture land, in a courſe of years it is found to have deſcended to the bottom of the ſoil, and to be in the ſtate of inſoluble carbonate. It could not have reached this poſition without ſolution. It ſeems therefore to combine with the carbonated gaſes which are generated in the ſoil, or which float on the ſurface of the earth, to enter with them into ſolution with water, and in its deſcent through the ſoil to give out the exceſs of theſe gaſes, which adhere very looſely, for the nouriſhment of plants. Whether the lime itſelf, while in ſolution enters into the veſſels of plants, is not known.

(2287.) Schrœder of Berlin analyſed the ſeeds of *wheat*, *rye*, *barley*, and *oats*, and alſo *rye-ſtraw*, and aſcertained the proportions of the ſeveral earths they contained. He afterwards made theſe ſeeds to grow in a box ſituated in a garden, to which ſun and air had free admiſſion, but from which all duſt was excluded. Inſtead of ſoil they were planted among flowers of ſulphur, and watered with diſtilled water. He found the corn raiſed in this manner to contain *more* earthy matter than had exiſted in the ſeeds from which it had grown. Here then unleſs we ſuppoſe that earths were conveyed by the air, this experiment ſeems deciſive that the earthy ingredients in plants are formed by the plants themſelves, during the proceſs of vegetation. There are other experiments to the ſame effect, which ſeem ſtrongly to corroborate the concluſions of Schrœder.

(2288.) Some plants require a portion of particular ſalts for their food. Thus marine plants will not thrive except in ſoils in which ſea ſalt abounds. In the ſun-flower is found a portion of nitrate of lime, and this plant thrives when watered by a weak ſolution of this ſalt. When various plants grow in the ſame ſoil, it is probable that though there be ſome ſpecies of food, ſuch as carbon, &c. which are common to all, yet that each ſelects ſome particular food, or modifies the ſame food, ſo as to accommodate itſelf. Plants are known to ſecrete a peculiar juice from their roots, which is ſuppoſed to prove nutrimental to plants of a different ſpecies. It has been eſtabliſhed by the moſt authentic experience, that a too frequent repetition of the ſame crop tends to exhauſt the ſoil; and that a regular alternation of corn and pulſe or green crops protracts the fertility of the land, and renders it capable of yielding the greateſt poſſible value from the manures and labour that have been beſtowed upon it.

SECT. III. DECOMPOSITION *of* VEGETABLES.

(2289.) Some vegetables only continue to grow during one ſeaſon, and are called annuals. Some grow during ſeveral ſucceſſive years, and ſome even live 1000 years, and are called perennial But all plants after they have ceaſed to vegetate, fall into decay, and have their organic texture gradually deſtroyed. The elements of which they are compoſed enter into new combinations, and form new products which did not previouſly exiſt in the vegetable. Some plants, and parts of the ſame plant, are more liable to this ſpontaneous decompoſition than others. In order that this ſpontaneous decompoſition may take place, a certain degree of heat and moiſture are neceſſary. For if plants be kept at or below the freezing temperature, they never decompoſe. Nor do they ever decompoſe if they be kept perfectly dry. The proceſs by which plants are decompoſed has obtained the name of *Fermentation*, either from the inteſtine motion excited by the eſcape of gaſes; or more probably from the increaſe of temperature which generally accompanies the decompoſition. Theſe different proceſſes were formerly ſuppoſed to ſucceed each other in regular order; but it is now underſtood that any of them may be made to commence firſt according as circumſtances are favourable. The different proceſſes of fermentation are diſtinguiſhed by the products which they form. 1. The *vinous* fermentation by which wine, or beer are formed. 2. The *acetous* fermentation which produces vinegar. 3. The *panary* fermentation by which bread is formed. 4. The *putrefactive* fermentation by which vegetables are wholly decompoſed, and leave nothing but an earthy reſiduum. We ſhall conſider them in this order; but ſome think that to theſe ſhould be added the *ſaccharine* fermentation by which ſugar is formed in germinating ſeeds, and in the organs of plants; and the *colouring* fermentation by which indigo and other colouring matters are developed.

I. Vinous Fermentation.

(2290.) This is alſo called the *ſpiritous* fermentation, becauſe it produces wine, from which ſpirits may be obtained by diſtillation. This proceſs muſt have been known at a very early period, for we read in the book of Geneſis that Noah planted a vineyard, and got drunk with the wine it produced; which ſeems to indicate that the vinous fermentation was known long before the time of Noah. To bring on this fermentation three things are neceſſary. 1. A certain proportion of ſaccharine matter, or ſugar. 2. Water, for if the materials be dry, ſugar continues unaltered. 3. A temperature from 60° to 70°. The juice of the grape, which is commonly called *muſt*, ferments of itſelf at a temperature approaching to 70°, and hence wine muſt have been early diſcovered in the warm climates where they probably uſed the expreſſed juice of the grape, or of other fruits as drink to quench their thirſt. To make the fermentation ſucceed well, a large body of of the liquor is convenient, becauſe ſmall quantities are apt to run into the acetous fermentation. In muſt, beſides ſugar, there is a portion of gluten, of jelly, and of tartar. It ſeems to be the gluten which conveys the diſpoſition towards ſpontaneous fermentation. The juices of all berries which contain ſugar, ſuch as gooſeberries, raſpberries, ſtrawberries, alderberries, currants, &c. &c. likewiſe the expreſſed juices of many fruits, ſuch as apples, pears, &c. &c. The juices of many trees, ſuch as the birch, the ſugar mapple, &c. &c. ferment ſpontaneouſly, and produce wine. The juice of the ſugar cane alſo ferments ſpontaneouſly, and from its wine, rum is extracted by diſtillation. If the juices of fruits or of berries contain too little ſugar, it is neceſſary to ſupply the deficiency by adding more. If they contain too much, and appear viſcid, water muſt be added, or fermentation will not take place, or it will go on very ſlowly. See Wine.

(2291.) Beer is fermented from the ſeeds of plants, after they have been converted into a ſaccharine ſubſtance by the proceſs of germination, or malting. See Malt and Malting.—Almoſt every ſpecies of corn has been employed for this purpoſe. In India they uſe rice; and Mr Mungo Park informs us that in the interior of Africa they make beer from the *holcus ſpicatus*. Our anceſtors uſed honey and various herbs to produce an intoxicating liquor to which they gave the name of Mead. In modern Europe, barley is the grain univerſally uſed for making beer, and it is commonly malted before it is applied to this purpoſe; though in ſome caſes, a proportion of raw grain is employed. The Greeks aſcribed the invention of beer to the ancient Egyptians.

(2292.) The extract of malt does not readily ferment of itſelf, even though the temperature be favourable; or it ferments very ſlowly; or is apt to run into the acetous or the putrefactive fermentations. To excite the vinous fermentation, a proportion of yeaſt is always added to the extract, or wort. Yeaſt is aſcertained to conſiſt chiefly of gluten in a particular ſtate, with a quantity of carbonic acid gas entangled in its viſcid ſubſtance. Though Mr Henry of Mancheſter excited the vinous fermentation by impregnating the liquor with carbonic acid gas, it does not appear that yeaſt owes its properties to this gas. The bakers of Paris have been long accuſtomed to bring their yeaſt from Flanders, and, to ſave carriage, they ſqueeze the juice through bags, and convey it in a dry form. In addition to this, Sir John Dalrymple dried yeaſt in rooms heated to a high temperature by ſtoves, after it had been previouſly ſqueezed in bags of cloth. His yeaſt appeared in the form of a dry powder, yet after being moiſtened with water, it excited the vinous fermentation, after being conveyed to London, to the Weſt Indies, and to ſeveral remote parts of the world. By his proceſs, at leaſt, no doubt can be entertained, but all the carbonic acid gas which previouſly exiſted in the yeaſt, was completely expelled. Yet ſoon after it was moiſtened it began to froth, and to emit carbonic acid gas as it did when freſh. It ſeems then that we are ſtill unacquainted with the properties of yeaſt, and indeed are much in the dark with regard to the moſt ordinary proceſſes which are going on around us. But yeaſt bears a ſtrong reſemblance to the gluten in muſt, and the expreſſed juices of fruits. When this is extracted from them, they will not ferment unleſs it be reſtored. Sugar, though diſſolved in water, will not ferment, but if mixed with the juices of fruits or berries, or with yeaſt, it ferments rapidly. The yeaſt, with a conſiderable addition of new yeaſt evolved from the fermenting maſs, riſes to the ſurface of the liquor, where it forms a frothy turbid ſcum. In the making of beer, the object is not to puſh the fermentation until all the ſaccharine matter be decompoſed; but to moderate its violence, and to check it in due time. For this purpoſe a certain quantity of hops is boiled with the wort before it is ſet to ferment. The eſſential oil of the hops conveys an agreeable flavour to the beer, and their bitter checks the violence of the fermentation, and prevents the liquor from running into the acetous or putrid fermentations. See Beer, and Brewery.

(2292.) But in the making of the *waſh* uſed by diſtillers, which is a ſpecies of beer, a different plan is followed out. They apply a much greater proportion of yeaſt, and puſh the fermentation until all the ſaccharine be exhauſted. They well know that if any ſugar remains in their liquor undecompoſed, it is loſt to them, and yields no ſpirit. Another circumſtance deſerves attention reſpecting the diſtillers. They find that a large proportion of raw grain, mixed with a ſmall proportion of malt, yields more ſpirit than if they operated upon malt alone. They vary their proportions of theſe ingredients, from 3 to 8 or 10 meaſures of raw grain to 1 of malt, according to the quality of the grain and of the malt. Theſe being haſhed, or bruiſed into coarſe meal, are thrown into their maſhing tun, and after the hot water is let in upon them, are violently agitated in order to produce a complete incorporation with the liquid. The conſequence is that a wort, or as they call it *waſh*, is produced, more highly ſaccharine than if the whole material operated upon had conſiſted of malt. Chemiſts have offered a plauſible reaſon why the germination of ſeeds, or the proceſs of malting, ſhould form ſugar. But to this proceſs they have not yet turned their perſpicacious eyes. Does the malt employed operate as a ferment to excite the production of ſugar in the raw grain, where it did not previouſly exiſt? In all known caſes, ſugar is only produced by the vegetating proceſs, to which this caſe bears no analogy. But this is not the proper place to diſcuſs the ſubject. See Malt and Malting.

(2295.) The phenomena attending the vinous fermentation are a violent agitation in the liquor. It becomes thick and muddy, and throws a voluminous frothy matter to the ſurface. Much carbonic acid gas eſcapes. The agitation and increaſe of bulk of the liquor, ſeem to be owing to the production and eſcape of this gas; and the agitation produced by the eſcape of this gas, ſeems to bring all the ſubſtances diſſolved in the liquor into chemical contact, ſo that they can mutually decompoſe each other. Acceſs of air is not neceſſary to the vinous fermentation; but there muſt be ſufficient opening to allow the carbonic acid gas to eſcape. Otherwiſe the proceſs will not commence, or will be wholly checked; as it is only by the agitation of the liquor, in conſequence of the eſcape of this gas, that the ingredients are brought to act upon each other. The carbonic acid in its eſcape carries off a conſiderable portion of the ſpirit already formed, and alſo of the unchanged liquor. It might, perhaps, be poſſible to conduct the carbonic acid through ſpaces where it might depoſit its ſpirit, ſo that diſtillers might gain as much, or at leaſt much better ſpirits from their fermenting tuns, than they obtain from their ſtills. During the fermentation, a conſiderable increaſe of temperature takes place, which varies according to circumſtances. This ſeems to militate againſt the received doctrines concerning heat, about which we have repeatedly ſtated our doubts.

(2296.) When the proceſs is finiſhed, which requires longer or ſhorter time, according to the temperature of the weather, and other circumſtances, the liquor is no longer muddy but tranſparent. Its ſpecific gravity is conſiderably diminiſhed. It has no longer a ſweet, but a vinous taſte, and conveys a ſenſation of heat to the palate. Boerhaave was the firſt perſon who attended to the phenomena of fermentation; and Lavoiſier has ſhewn that during the proceſs there is a mutual decompoſition of ſugar and water, by which alcohol, or ardent ſpirit is produced. But as we have already entered fully into this matter, while treating of inflammable liquids, it is unneceſſary to recapitulate what was there ſaid in this place. Chaptal has alſo ſhewn that in the fermentation of wine, a portion of the tartaric acid is decompoſed, and converted into malic acid; and that, during the proceſs, a quantity of azotic gas is evolved. From what ſource this gas ariſes we are at a loſs to decide. Sugar is not known to contain any of it; and the experiments of Lavoiſier lead us to conclude, that the production of ſpirit ceaſes, and the vinous fermentation ſtops, when all the ſugar in the liquor is decompoſed.

II. Acetous Fermentation.

(2297.) This was long conſidered by philoſophers as a neceſſary conſequence of the vinous fermentation, and that it could not commence unleſs the vinous had preceded it. But there is not an old woman in Scotland, who has been accuſtomed to ſteep the huſks of her oats, with the coarſeſt particles of the meal which do not paſs through the ſieve, with a view to make *ſowens*, that is not qualified to ſubvert the theories alluded to, which ſtill exiſt. She knows that her huſks, and coarſe meal, ſoon yields a highly acid liquor, without the ſmalleſt ſymptom of ardent ſpirit having been formed in it.

(2298.) But although the acetous fermentation may commence firſt, it always ſucceeds the vinous fermentation if not prevented. To make it advance briſkly, it is neceſſary that the liquor ſhould be kept at a temperature from 70° to 90°. It is alſo neceſſary, that it ſhould have acceſs to atmoſpheric air; though there is an exception to to the rule. For when water in which the gluten of wheat has been fermented has been mixed with ſugar, the liquid becomes vinegar without contact of air, and without any apparent fermentation. In the ordinary proceſs a manifeſt fermentation takes place, ſometimes accompanied with a hiſſing noiſe. A ſmall portion of carbonic acid is diſengaged. The liquid becomes turbid, and depoſits a quantity of gluten in flakes. After the proceſs is completed, the malic acid, and the alcohol, which previouſly exiſted in the wine have diſappeared. But as we explained the nature of vinegar when treating of the vegetable acids, it ſeems unneceſſary to add any more here.

III. Panary Fermentation, *or the* Formation *of* Bread.

(2299.) There is reaſon to ſuppoſe that the fermentation of bread had been diſcovered by the ancient Egyptians. Before the Iſraelites went down to Egypt, there is no mention of leavened bread in their hiſtory. But in the Book of Leviticus they are prohibited from uſing leavened bread during the celebration of the paſſover; which indicates that leavened, or fermented bread, was now their ordinary food. Some think the fermentation of bread to be a peculiar proceſs, others that it is every way ſimilar to the former fermentations; but ſufficient attention has not been paid to the reſult, to enable us to decide the queſtion.

(2210.) In making leavened bread, the flour of wheat is commonly uſed. Rye and the flour of other grain is ſometimes employed, but as theſe contain leſs gluten than wheaten flour, they do not ferment ſo readily. A quantity of flour is made into a paſte with water, in which hops, or ſome bitter ſubſtance had been infuſed. After ſome time it is agitated with inteſtine motion, and gaſes are evolved. When completed, the gluten in the flour is entirely decompoſed. This firſt portion is called the leaven, and it makes bread of a diſagreeably ſour taſte. A ſmall quantity of this ſour leaven is now mixed with other paſte, and excites in it a rapid fermentation. The quantity of leaven neceſſary depends upon the goodneſs, and age of the flour. If too much be added, the bread acquires a diſagreeable ſour taſte; and if too little, it is not ſufficiently raiſed, as the bakers expreſs it. When the fermentation ſucceeds, the paſte ſwells up, and becomes full of cells, owing to the diſengagement of carbonic acid gas, which is confined in the maſs by the viſcidity of the glutinous part of the flour.

(2300.) The ancient Gauls firſt applied yeaſt, or *barm*, in the fermenting of bread, and it is leſs apt to excite a diſagreeable acidity than leaven.—After the paſte has been properly fermented, or raiſed, it is made into loaves, and put into an oven which is kept at an equable temperature. This is regulated by throwing a little flour upon its bottom which, if it blackens without taking fire, the oven is judged to be of the proper degree of heat. This degree is about 448°. Here the bread ſwells, and becomes full of cavities, owing to the expanſion and extrication of gaſes. It alſo loſes a conſiderable weight, owing to the evaporation of moiſture. When freſh baked, bread emits an agreeable odour, which ceaſes after expoſure to the air. Parmentier found that a very white and light bread might be made from potatoes. They are boiled and reduced to a fine paſte, and have their own weight of ſtarch made from the ſame root mixed with them. The loaves are made to aſſume a brown colour, by gently moiſtening them with water.—It is underſtood that the principles which compoſe flour, undergo a complete change during the fermentation and baking of bread; but what the nature of that change is has not been aſcertained. A portion of ſalt is commonly diſſolved in the water with which the paſte is made, to ſeaſon the bread. Some add a ſmall portion of alum in ſolution, which by its great expanſion when it parts with its water of cryſtallization, aſſiſts the carbonic acid gas in rendering the bread porous and cellular.

IV. PUTRID FERMENTATION.

(2301.) For this, as for all the other fermentations, a certain degree of moiſture is neceſſary; and it would appear that the water is decompoſed. All plants, as well as their ingredients ſeparately are liable to be decompoſed, and entirely deſtroyed by the putrid fermentation. Though air be not abſolutely neceſſary, this proceſs always goes on moſt rapidly when the ſubject is expoſed to it. A temperature not much under 45°, and not too high, ſuddenly to evaporate the moiſture, alſo promotes putrefaction. This proceſs is attended with a fetid odour, owing to gaſes which are emitted, combined with a portion of the putrefying ſubſtance. Gluten and cruciform plants emit ammonia, onions emit phoſphureted hydrogen gas. The carbonic acid and hydrogen gaſes, are always emitted in abundance. The temperature of the putrefying ſubſtance is raiſed. There is reaſon to conclude that putrefaction is every way analagous to inflammation. A moiſt hay ſtack has been known to putrefy ſo rapidly that it actually took fire. But our knowledge of fermentation is ſtill too limited to warrant our deciding poſitively concerning it.

SECT. IV. VEGETABLE PRODUCTS.

(2302.) Theſe either exude from plants while they are in a living ſtate, or are extracted from them after their life has ceaſed, by various means. They may all be reduced to IV. Claſſes. I. Thoſe which are uſually ſolid, and not very combuſtible. II. Subſtances which are fluid, or melt with heat, and burn like oils, and are all inſoluble in water, though they are generally ſoluble in alcohol. III. Subſtances which are not ſoluble in water, alcohol, nor ether. IV. Foreign ſubſtances which ſeem to belong to the mineral kingdom.

I. Claſs.
1. Acids
2. Sugar
3. Sariocoll
4. Aſparagin
5. Gum
6. Jelly
7. Ulmin
8. Inulin
9. Starch
10. Indigo
11. Gluten
12. Albumen
13. Fibrin
14. Gelatine
15. Bitter principle
16. Extractive
17. Tannin
18. Narcotic principle.

II. Claſs.
19. Fixed oil
20. Wax
21. Volatile Oil
22. Camphor
23. Bird-lime
24. Reſins
25. Guaiacum
26. Balſams
27. Gum reſins
28. Cauotchuc

III. Claſs
29. Cotton
30. Suber
31. Wood

IV. Claſs.
32. Alkalies
33. Earths
34. Metals.

I. ACIDS.

(2303.) The acids which have been found ready formed in vegetables are

1. Acetic
2. Oxalic
3. Tartaric
4. Citric
5. Malic
6. Gallic
7. Benzoic
8. Pruſſic
9. Phoſphoric

Sometimes the ſulphuric, nitric, and muriatic acids are found combined with alkalies or earths, but never except in very minute quantities.—As we entered fully into the properties of theſe acids when treating of that diviſion of the ſubject, we eſteem it unneceſſary to repeat what was there ſaid in this place.

II. SUGAR.

(2304.) Sugar ſeems to have been known in India and China from the remoteſt times. It was firſt brought to Europe by the conqueſts of Alexander the Great. Pliny and Dioſcorides ſpeak of it, but in very indiſtinct terms. During the Cruſades the Venetians brought it from India, and carried on a lucrative trade in ſugar with the reſt of Europe It long continued to be uſed only as a medicine; but ſince it began to be extenſively cultivated in the Weſt Indies, it now enters largely into the compoſition of our food. In the Eaſt and Weſt Indies it is extracted, by compreſſion, from the *arundo ſaccharifera*, or *ſugar cane*. In America it is extracted from the *acer ſaccharinum*, or *ſugar maple*, but in too ſmall quantity for exportation. In Pruſſia, and other parts of Germany, it has lately been extracted from the *beet root*; though this ſource of it ſeems to be too ſcanty ever to rival the ſugar cane, ſugar is alſo found in a variety of other plants, in grapes, and various fruits. The methods by which it is extracted, and the various purifications it undergoes before it is prepared for uſe, are detailed in another part of this work.—See Sugar.

(2305.) Pure ſugar is of a white colour, is not altered by the air, though in moiſt air it imbibes a little water. It has a ſtrong ſweet taſte, but no ſmell. It is brittle, and eaſily reduced to powder. In the dark, when two pieces are rubbed againſt each other, they emit a ſtrong phoſphoreſcent light. It is very ſoluble in water, which at 48° diſſolves its own weight of ſugar. At the boiling temperature, water takes up any quantity of ſugar. When water is ſaturated with ſugar, it is called *ſyrup*, which is ropy and adheſive, and when ſpread upon paper it forms a ſort of varniſh which water ſoon diſſolves. When ſyrup is concentrated by boiling, and poured into pans which are kept in a room heated by ſtoves, ſo as to be ſcarcely ſupportable by animals, the ſugar cryſtallizes on ſmall ſticks placed in the pans for that purpoſe. The cryſtals are uſually four or ſix-ſided priſms, terminated by two-ſided, and ſometimes by three-ſided ſummits This is called *candied ſugar*. According to Farenheit the ſpecific gravity of very white ſugar is 1·6065; according to Haſſenfrats it is only 1·4045.

(2306.) The alkaline earths combine with ſugar, and ſuperadd a bitter and aſtringent to its ſweet taſte. When lime is precipitated from it by ſulphuric acid, it recovers its former ſweet taſte. The fixed alkalies deſtroy the ſweet taſte of ſyrup more effectually than lime; but if they be precipitated by alcohol the ſweet taſte is reſtored.

(2307.) The acids diſſolve ſugar, and the concentrated acids decompoſe it. Sulphuric acid converts it into water, acetic acid, and a bulky reſiduum of charcoal, of a black colour; while the ſulphuric is converted into the ſulphurous acid. Nitric acid converts it into the malic and oxalic acids, as ſtated when treating of theſe acids. Liquid oxymuriatic acid converts it into malic acid, and is itſelf changed into the common muriatic acid. Muriatic acid gas makes it aſſume a brown colour, with a ſtrong ſmell. The vegetable acids diſſolve but do not ſeem to alter ſugar. Alcohol diſſolves from about a 12th to a 16th part of its weight of ſugar. When left undiſturbed, the ſugar ſeparates in beautiful cryſtals. A moderate quantity of ſugar retards the coagulation of milk, but a large quantity cauſes it to coagulate. The hydroſulphurets, ſulphurets, and phoſphurets of alkalies and alkaline earths, decompoſe ſugar, and change it into a ſubſtance reſembling gum.

(2308.) When heated, ſugar melts, ſwells, becomes browniſh black, and emits air-bubbles, with a peculiar ſmell, to which the French have aſſigned the name of *caromel*. With a red heat it takes fire with a kind of exploſion. When diſtilled, it firſt yields water, then pyromucous acid, which is a compound of oil and acetic acid; afterwards empyreumatic oil, and a bulky reſidue of charcoal remains in the retort. Mr Cruickſhanks introduced 480 grains of pure ſugar into a retort, and after heating them to redneſs, obtained the following products.

Pyromucous acid with a drop or two of oil	270 grains
Charcoal	120
Carbureted hydrogen, and carbonic acids	90
	480

(2309.) From theſe experiments it is inferred that ſugar is a vegetable oxide, compoſed entirely of oxygen, carbon, and hydrogen. Lavoiſier, from a ſeries of experiments on the vinous fermentation, concluded that theſe ingredients enter into the compoſition of ſugar in the following proportions.

64	oxygen
28	carbon
8	hydrogen
100	

(2310.) Some kinds of ſugar, probably owing to extraneous matters with which it is combined, differ in properties from that which is extracted from the cane.—This ſubſtance forms a ſpecies of food which is very agreeable to the palate of moſt animals. It probably contains more nouriſhment under the ſame weight than any other vegetable product. No bad effects are known to reſult from its moderate uſe; though Dr Coventry thinks the immoderate uſe of ſugar is the cauſe of the frequency of conſumptions in modern times.

III. Sarcocoll.

(2311.) Is ſaid to exude from the *penæa ſarcocolla*, a ſhrub which is indigenous in the north eaſtern parts of Africa. It comes to Europe in the ſhape of oblong grains, from the ſize of a pea, to that of a grain of ſand. Its colour yellow, and ſometimes reddiſh brown, and it reſembles gum arabic. It ſmells ſomewhat like anniſe ſeed. It contains four different ſubſtances, of which the pure ſarcocoll is by far the moſt abundant. The ſarcocoll is ſeparated by ſolution in water and alcohol, when it aſſumes the appearance of jelly. It amounts to about $\frac{8}{10}$ths of the maſs. When the liquor is evaporated, it aſſumes the appearance of brittle brown cakes like gum. Its ſpecific gravity is 2 1584. Its taſte is ſweet, but leaves an impreſſion of bitterneſs. It ſeems to be a compound of ſugar and gum, but partaking more of the properties of ſugar.

(2312.) *Liquorice* ſeems to be a variety of ſarcocoll. It is obtained by expreſſion from the roots of the *glycirrinzha glabra*, a plant cultivated in the South of Europe, and of Britain. The juice is thickened by boiling. It comes from Spain in rolls wrapped in bay leaves, and is afterwards purified, and formed into ſmall cylinders about the ſize of a gooſe quill, which are ſold under the name of *refined liquorice*. It is black and gloſſy, and beſides ſugar, contains about a third of mucilage, and ſome charcoal, which is not found in pure ſarcocoll.—Theſe may be regarded as varieties of ſugar, or rather ſugar combined with other ſubſtances.

IV. ASPARAGIN.

(2313.) This ſubſtance was lately detected by Vauquelin and Robiquet in the juice of aſparagus. The juice being ſqueezed out, is evaporated to the conſiſtence of ſyrup and ſet aſide. Various cryſtals appear, and among others thoſe of aſparagin are white and tranſparent and have the figure of rhomboidal priſms. It is hard and brittle; its taſte cool and ſlightly nauſeous. Does not diſſolve in alcohol; in hot water diſſolves readily, but ſparingly in cold water.

V. GUM.

(2314.) Gum and mucilage are commonly confounded together, though Hermſtadt ſhews there is a ſhade of difference betwixt them, and that gum may be ſeparated from mucilage by dropping into a ſtrong ſolution of them ſulphuric acid. The mucilage coagulates, while the gum remains diſſolved and may be decanted off.—Gum exudes in the form of a taſteleſs juice from a great variety of trees, eſpecially from thoſe of the *mimoſa* ſpecies. What is called *gum arabic*, exudes from the *mimoſa nilotica*. It alſo exudes from the cherry, the wild cherry, and the plumb tree of this country.—It is uſually in ſmall pieces like tears, hard, and ſo brittle that it can be reduced to powder. It is colourleſs when pure, but is commonly of a yellowiſh tinge. It has neither ſmell nor taſte, and its ſpecific gravity varies from 1·3161 to 1·4817. Expoſed to the ſun's rays it becomes white. Its ſolution in water is called *mucilage*, which is thick and adheſive, and is often uſed to give luſtre and ſtiffneſs to linen. When ſpread out it ſoon dries, and aſſumes the appearance of a varniſh, but water ſoon renders it glutinous, or waſhes it away. When the water is evaporated the gum is obtained unaltered. When its ſolution is expoſed to the air, it ſoon becomes mouldy on the ſurface, but it may remain ſeveral years without putrefaction. At laſt, however, the ſmell of acetic acid becomes perceptible in it. Expoſed to heat, gum ſoftens and ſwells, but does not melt. Air-bubbles are emitted, it becomes black, and when reduced to charcoal, emits a low blue flame. When entirely conſumed a ſmall quantity of white aſhes remains, compoſed chiefly of the carbonates of lime and potaſh. Concentrated oxymuriate of iron dropped into a ſtrong ſolution of gum, converts it into a brown ſemitranſparent jelly, which is not very ſoluble in water. Silicated potaſh produces a white flaky precipitate in ſolution of gum, while the liquid remains tranſparent.—This forms a very delicate teſt of gum in ſolutions.

(2315) Liquid potaſh firſt converts gum into a curd, and then diſſolves it; but it afterwards reverts to its curdled ſtate. Lime water and ammonia likewiſe diſſolve gum, which may afterwards be ſeparated little altered. Charcoal powder gives ſolution of gum a black colour, which cannot be removed by filtration. But if the charcoal be in great quantity, it retains the whole of the gum, and the water paſſes clear.

(2316.) The vegetable acids diſſolve gum without change. Sulphuric acid decompoſes it, and there remains about 29 per cent of charcoal. Some tannin is formed with water and acetic acid. Strong muriatic acid forms a brown ſolution, from which ſome charcoal falls. If this ſolution be ſaturated with ammonia, evaporated to dryneſs, and the reſidue digeſted in alcohol, a brown ſubſtance is extracted, which when evaporated to dryneſs bears a ſtrong reſemblance to ſugar. Oxymuriatic acid converts gum into citric acid. Nitric acid, with heat, converts it into ſacclactic acid, malic acid, and oxalic acid.

(2317.) Gum is inſoluble in alcohol, and when alcohol it dropped into its ſolution, the gum is precipitated in white flakes. Gum and ſugar readily unite when both are diſſolved in water. Alcohol diſſolves a great part of the ſugar in the mixture, and leaves a white ſubſtance compoſed of gum and ſugar reſembling the material of which the neſts of waſps is compoſed.

(2318.) Mr Cruickſhanks gradually heated to redneſs, in a coated glaſs retort, 480 grains of gum arabic, and obtained the following products.

Pyromucous acid mixed with ſome oil	210 grains
Charcoal	96
Lime and a little phoſphate of lime	10
Carbureted hydrogen, and carbonic acid gas	164
	480

Vaquelin found ſome traces of iron in gum. It follows that gum contains oxygen, hydrogen, carbon, and azote, beſides lime and iron. Hence ſugar is a triple compound, but gum contains four conſtituents, and apparently leſs oxygen than ſugar.

(2319.) Beſides gum arabic, there are various ſpecies of gum in common uſe, as *gum ſenegal*, *gum tragacanth*, *gum kuteera* the gum, of the *cherry* and *plumb-tree*, &c. A mucilage alſo abounds in the leaves and roots of many plants, which might be extracted and uſed as gum. The bulbs of the hyacinth contain ſo much mucilage, that when dried they may be uſed as gum. George of Peterſburg found that the ſtringy lichens yield a mucilage which Lord Dundonald propoſed to employ as a ſubſtitute for gum, and it is much uſed by the calico printers for that purpoſe. The fuci, or ſeaweeds, yield a mucilage which ſeems capable of anſwering the purpoſes of gum, could it be deprived of theſe deliqueſcent ſalts which the fuci imbibe from ſea water.

(2320.) Gum, in the ſtate of mucilage, is a very nutritive food. It is often uſed as a paſte; and the calico printers uſe great quantities of it to give conſiſtency to their colours, and prevent them from ſpreading upon the cloth. For the ſame reaſon it is employed in the making of ink. It forms the baſis, or vehicle, of many mixtures applied in medicine.

VI. JELLY.

(2321.) If the juice of bramble berries, raſpberries,

ries, currants, and a variety of other fruits, be ſqueezed through a cloth and ſet to reſt, part of it coagulates. If the liquid part be poured off, and the coagulum waſhed with cold water, jelly is obtained nearly in a ſtate of purity. Its colour is that of the berries from which it was ſqueezed. It is ſcarcely ſoluble in cold water, but very ſoluble in hot water, and when the ſolution cools it again coagulates into a jelly. If long boiled it does not afterwards coagulate. This is the reaſon why in making currant and other jellies, if a ſufficient quantity of ſugar be not added to abſorb all the juice of the fruit, if they attempt to concentrate it by long boiling, it remains ever after liquid, and no jelly is formed. Jelly combines readily with alkalies; nitric acid converts it into oxalic acid, with hardly ſeparating azotic gas. It becomes tranſparent when dried; and when diſtilled it yields a great quantity of pyromucous acid, a ſmall quantity of oil, and hardly any ammonia. Perhaps jelly is merely gum combined with vegetable acid.

VII. Ulmin.

(2322.) We know nothing of this ſubſtance except from Klaproth, to whom a ſpecimen was ſent from Palermo in 1802, and he conjectures it to be an exudation from the *ulmus nigra*. It is of a black colour, reſembles gum in being readily ſoluble in water, but differs from it in the ſolution not being ropy, nor forming a paſte. It agrees with gum in being inſoluble in alcohol and ether, and in being precipitated from aqueous ſolution by alchol in light brown flakes. The nitric and oxymuriatic acids, by imparting oxygen to it, convert it into a reſin, inſoluble in water. In this reſpect it ſeems to be allied to the volatile or eſſential oils, which are changed into reſins by abſorbing oxygen, as explained when we were treating of theſe oils. When burnt it emits little ſmoke or flame, but leaves a ſpongy charcoal, which when burnt in the open air leaves a little carbonate of potaſh.

VIII. Inulin

(2323.) Was extracted by Roſe by boiling the roots of the *inula helenium*, or elecampane. The decoction, after ſtanding ſome time, depoſits the *inulin* in the form of white powder, like ſtarch. As far as appears reſpecting this ſubſtance, it ſeems to be only a variety of ſtarch, or ſtarch combined with ſome other vegetable product.

IX. Starch.

(2324.) Starch is commonly made from wheat, and the proceſs employed by manufacturers is to ſteep the wheat in cold water, the pureſt that can be got, until it becomes ſoft, and yields a milky juice when ſqueezed. It is then put into coarſe linen bags, and preſſed in a vat filled with water, which forces a milky juice through the cloth, containing much ſtarch; and the preſſure is repeated as long as the wheat yields any milky juice. The ſtarch gradually falls to the bottom while the liquid gradually ferments into alcohol and vinegar, partly at the expenſe of the ſtarch. The vinegar diſſolves impurities, and the fermented liquor being poured off, the ſtarch is repeatedly waſhed with water. It is afterwards dried with a moderate heat and during the drying it ſplits into columnar maſſes which affect the quadrangular figure.

(2325.) Wheaten ſtarch has a fine white colour, with an inclination to blue. It has hardly any ſmell or taſte, and when dry, is not injured by long expoſure to the air. It falls in powder, but forms a ſort of emulſion with cold water; but forms a jelly with boiling water, which may be diluted by adding more water. When the water cools, the ſtarch ſlowly falls to the bottom. Linen dipped into a ſolution of ſtarch, and ſuddenly dried, acquires a conſiderable degree of ſtiffneſs. Hence one great uſe of ſtarch is to convey a degree of ſtiffneſs, and a ſmooth ſkin to linen after it is bleached, and to linen clothes in the laundry. When the ſolution is evaporated to dryneſs, a brittle opaque ſubſtance is obtained, differing in appearance from common ſtarch, probably owing to a portion of water retained in its compoſition. If ſtarch be expoſed to damp air, its ſurface becomes mouldy, and it acquires an acid taſte.

(2326.) The infuſion of nutgalls combines with ſtarch, and throws it down from every ſolution. The precipitate is again diſſolved by heating the liquid to 120°. The ſolution of nutgalls and ſtarch is tranſparent, and has nearly the colour of the nutgal infuſion. Thus infuſion of nutgalls forms the beſt teſt of the preſence of ſtarch in any vegetable decoction. Potaſh triturated with ſtarch, and a little water, forms a ſemitranſparent jelly. On adding more water, an opal coloured ſolution is obtained, from which the ſtarch may be thrown down by an acid. When muriatic acid is uſed, an aromatic odour is produced. Sulphuric acid diſſolves ſtarch ſlowly, with ſuch evolution of charcoal that if the quantity of ſtarch be conſiderable, the compound becomes ſolid. At the ſame time a ſmell of ſulphurous acid is perceptible, ſhewing that part of the ſulphuric acid is decompoſed. Diluted ſulphuric acid diſſolves ſtarch with heat, without apparent decompoſition, as the ſtarch may be thrown down by alcohol. Nitric acid diſſolves ſtarch, without forming oxalic acid, unleſs when aſſiſted by heat, in which caſe both oxalic and malic acids are formed. In this reſpect ſtarch differs from ſugar. Strong muriatic acid alſo diſſolves ſtarch ſlowly, without efferveſcence.

(2327.) When thrown upon a hot iron, ſtarch melts, ſwells, froths, blackens, and burns with a bright flame like ſugar, but it does not explode like the latter. At the ſame time it emits much ſmoke. When diſtilled it yields acidulous water, empyreumatic oil, and much carbonic acid and carbureted hydrogen gas. The charcoal which remains is wholly conſumed when burnt in the open air; a proof that it contains little or no earth.

(2328.) Starch is found in a great variety of plants, and in different parts of plants. It is moſt commonly found in the ſeeds and bulbous roots of plants which are uſed as food. The ſeeds of ſeveral trees contain it, as the cheſnut, horſe-cheſnut, and acorn.—Having already ſtated the mode by which it is obtained from wheat; we ſhall briefly enumerate the other ſources from which it is commonly obtained.

(2329.) *Potatoe ſtarch* is made by grating down the potatoe, and placing the gratings upon a fine ſieve, over a tub or vat. Water being poured upon them, waſhes through a great quantity of ſtarch. After it has time to ſettle, the acidulous liquor is poured off, and the ſediment well waſhed with pure water. If the ſediment be ſufficienty waſhed, it is ſtarch of a much brighter colour, and which goes much farther, than wheaten ſtarch. Though heavier than wheaten ſtarch, it makes a much more beautiful hair powder.—In one of the late bad ſeaſons when the ſtarch manufactories and the diſtillation from grain were ſtopped, and when a great part of the potatoe crop was frozen in the ground by early froſt, George Robertſon Eſqr. author of the Agricultural ſurveys of Edinburgh and Mearns ſhires, made excellent ſtarch from froſted potatoes. Having firſt cleaned them, he bruiſed them into a pulp and then treated them as above deſcribed. Though the potatoes were not half ripe he calculated they might yield L 50 value per acre in ſtarch. This deſerves the attention of Agriculturiſts, as frozen potatoes are good for nothing elſe.

(2330.) *Sowens* is a ſpecies ſtarch made from the huſks and coarſe particles of oat-meal. The acid liquor being poured off, the ſtarch, with a portion of the acid, is boiled in a pot; after which it forms a coagulum on cooling, well known in Scotland as a nutritive and agreeable ſpecies of food.

(2331.) *Sago* is extracted from the pith of ſeveral ſpecies of palm trees in the Moluccas, Philippines, and other iſlands in the Eaſt Indies. The palm being cut into pieces, the wood is ſplit off one ſide expoſing the pith in the hollow of the tree. Upon this cold water is poured and the pith well ſtirred, which ſeparates the ſtarch from the fibrous part; and what runs off is paſſed thro' a fine ſieve, or ſearce. The ſtarch is now allowed to ſettle, the water is poured off, and when the ſediment is half dry it is granulated by being paſſed through a funnel. It is ſaid to acquire its grey colour by being dried by artificial heat. Sago is well known as a very nouriſhing food.

(2332.) *Caſſava* is prepared from the roots of an American plant, the *jatropha manihot*. They are peeled and preſſed in a ſack compoſed of ruſhes. A juice is forced out which is a deadly poiſon, and employed by the Indians to poiſon their arrows. Th s juice gradually depoſits a white ſtarch, which being well waſhed is innocent. What remains in the ſack is alſo chiefly compoſed of ſtarch, and being dried in ſmoke, and paſſed through a ſieve, from the ſtarch thus obtained the caſſava bread is formed, which is often brought to Europe, and is highly nutritive.

(2333.) The ſour water poured from ſowens, and what is produced by the ſtarch makers is greedily devoured by ſwine, who fatten upon it. It has alſo been lately diſcovered that the grains and dregs of diſtillers and brewers go much farther in fattening all kinds of cattle, after they become ſour, than when they are conſumed in a ſweet ſtate. It has hence been inferred by rural economiſts that all kinds of vegetable food, which admit of it, ſhould be ſoured before they are preſented to animals.

X. Indigo.

(2334.) This beautiful pigment and dyeſtuff is extracted from the leaves of different ſpecies of plants, as the *indigo fera argentea*, or *wild indigo*, which yields the beſt, though the ſmalleſt quantity; from the *indigo fera diſperma*, or *Guatimela indigo*; and the *indigo fera tinctoria*, or *French indigo*, which though of inferior quality yields the largeſt quantity, and is hence generally preferred by the planters. The plants are annually raiſed from ſeeds ſown in trenches about a foot aſunder. In the Weſt Indies they are ſown in March, and the plants are ready for cutting in May. Here four cuttings are often obtained in one year; but in South America they require ſix months to attain maturity, and they ſeldom obtain more than two cuttings, often only one.

(2334.) The plants are cut with ſickles and placed in a ciſtern about 16 feet ſquare, where they are preſſed down with laoded planks. They are then covered with water to the depth of four or five inches. A fermentation takes place, which Le Blond thinks ſucceeds beſt with a temperature about 80°. The water becomes turbid, aſſumes a green colour, while volatile alkali, and carbonic acid gas are emitted. Much attention is paid to this fermentation, becauſe if carried too far, the colour is deſtroyed, if checked too ſoon, much of colour remains in the plants. When completed, the liquor is let into a ſmaller ciſtern, placed below the former, called the *battery* where it is violently agitated by levers moved by machinery, about 15 or 20 minutes. Flocculi begin to appear, and the liquor ſeems curdled. A quantity of lime water is now poured in, which is ſuppoſed to prevent putrefaction, or to abſorb carbonic acid gas, and haſten the depoſition of the colour. The pigment is now allowed to ſubſide; after which the water being drawn off, it is drained in ſmall linen bags, and then dried in ſmall wooden boxes in the ſhade.

(2336.) Dr Roxburgh obtained indigo from the leaves of the *merium tinctorium*, a tree very common in Hindooſtan. He kept the leaves in a copper full of water, at the temperature of 100°, until they aſſumed a yellowiſh blue colour, and the liquor a deep green colour. After which the liquor was drawn off, and treated as in the former caſe. Several chemiſts have alſo obtained indigo from the *iſatis tinctoria*, or *wood*, a plant which grows wild in many parts of this country, and is much uſed as a dye-ſtuff. They treated the wood in the ſame way as was juſt deſcribed reſpecting the *indigo fera tinctoria*. Some think the ancient Picts uſed this plant for dyeing their ſkins of a blue colour.—Chaptal elicited a blue colonr from *goats rue*, *Sainfoin*, *chick peas* and *lucern*, when treated after the manner of indigo. But he was not able to precipitate the colour, and he aſcribes his failure to an exceſs of extractive matter, which cauſed the liquor to froth, and kept the colour ſuſpended.

(2337.) Indigo ſeems to have been known in the Eaſt indies, as its name imports, from the earlieſt times. It was firſt brought to Europe, and its uſes made known, by the Dutch, in the 16th century. It may ſeem very ſtrange that it was verſally cried down as a deſtructive dye. Its uſe was prohibited in England by Queen Elizabeth, and the prohibition was not removed until the reign of Charles II. Colbert reſtricted the French dyers to a limited quantity of it. In Saxony it was prohibited, and the reaſons aſſigned in the Edict were that it was a corroſive ſubſtance, only fit to be *food for the Devil.* It was afterwards cultivated in Mexico and the Weſt Indies, and theſe countries long ſupplied Europe with this article. Some of our enlightened countrymen have lately reſtored the Eaſt Indian indigo to its ancient reputation, and it is now imported from the Eaſt in conſiderable quantities.

(2338.) Indigo is a light, compact, friable ſubſtance of a deep blue colour. The tints of its ſurface vary according the manner of its preparation, between copper, violet, and blue. The lighteſt indigo is the beſt; and it is always mixed with other matters, derived either from the plant, or from careleſſneſs in its manufacture. Bergman found the beſt indigo he could procure, to contain the following ingredients.

47	pure indigo,
12	gum,
6	reſin,
22	earth,
13	oxide of iron.
100	

The earth conſiſted of

10·2	barytes,
10·0	lime,
1·8	ſilica.
22·0	

Prouſt found a conſiderable portion of magneſia in the indigo he examined; and it is probable the earthy ingredients vary in different ſpecimens.—Indigo when freed of theſe extraneous matters, is a ſoft powder, of a deep blue colour. It is not altered by air or water, though Bergman obſerved that when long kept under water, it gave ſigns of putrefaction. Heated it burns with a bluiſh red ſmoke, and a faint white flame, and leaves earthy aſhes.

(2339.) Concentrated ſulphuric acid diſſolves it readily, and the ſulphate of indigo, thus formed is called *liquid blue.* When much concentrated it appears black, but when diluted is of a fine blue colour. A ſingle drop of the preparation communicates a blue colour to many pounds of water. Smoking ſulphuric acid, or the acid in which ſulphur has been boiled, diſſolves indigo more readily than the pure acid. If the ſulphate be poured into boiling water, it becomes green, but if into cold water, it exhibits a fine blue colour.

(2340.) Nitric acid attacks indigo with great violence, unleſs it be largely diluted with water. When of the ſpecific gravity 1·52, it ſets indigo on fire. Upon a 100 grains of indigo, Mr Hatchett poured an ounce of nitric acid, diluted with two ounces of water. When the efferveſcence began to ſubſide, the liquid was evaporated to dryneſs on a ſand bath, water being now poured on, formed a beautiful yellow ſolution, of a very bitter taſte. It appeared that artificial tannin had been formed, which, when combined with indigo, forms this colour. When four parts of nitric acid are boiled upon one part of indigo, it is converted into tannin, oxalic acid, benzoic acid, and *bitter principle.* The other acids only diſſolve indigo, as far as yet known, after it is precipitated from the ſulphuric; and with it they form a ſolution of a blue colour. The fixed alkaline ſolutions, alſo, only act upon indigo, after it is precipitated from a previous ſolution. The alkaline ſolutions are at firſt green, but afterwards become yellow. Ammonia, and the alkaline earths produce nearly the ſame effects.

(2341.) When indigo is mixed with bran, wood, Brazil wood, and other ſubſtances which readily ferment, it acquires a green colour, and eaſily combines with lime or potaſh. With ſuch mixtures the vat is commonly prepared when indigo is uſed as a dye.—See DYEING.—It would appear that the blue colour of indigo is owing to an exceſs of oxygen in its compoſition; for ſuch ſubſtances as powerfully attract oxygen, change it to green, to yellow, or render it colourleſs. When cloth comes out of the vat, it is at firſt green, but ſoon becomes blue by attracting oxygen from the air. If the agent change it to yellow, it never recovers its firſt colour, but the yellow remains permanent. On the other hand when indigo is mixed with manganeſe, and other bodies which freely impart oxygen, its yellow colour is changed, or deſtroyed.

(2342.) Bergman diſtilled 576 grains, of common indigo in a retort connected with a pneumatic apparatus, and obtained the following products.

19	grains carbonic acid gas
173	yellow acid liquor containing ammonia,
53	oil,
331	charcoal.
576	

From his preceding experiment it appears that 158 grains of earth and iron ought to have been deducted from 331 grains he ſtates as charcoal, which leaves 173 grains of real charcoal in the compoſition of the indigo. The concluſion from this experiment is, that indigo is compoſed of much oxygen and carbon, with ſome hydrogen and azote.—But we are far from thinking its conſtituents are yet ſufficiently aſcertained.

XI. GLUTEN.

(2342.) Beccaria, an Italian philoſopher, firſt diſcovered, that if wheat flour be made into dough with a little water, and then kneaded and worked with the hand under a rill of water, or ſtream from a tea-kettle, ſtarch and mucilage are waſhed off. After the water paſſes off clear, there remains a ſubſtance called *gluten.* It is of a grey colour, ductile, and elaſtic, and may be drawn to twenty times its original length without breaking. When made thin, it is white, and very much reſembles animal tendon, and adheres ſo tenaciouſly that it is often employed to cement broken pieces of china. It has ſcarcely any taſte, has a peculiar ſmell, and after expoſure to the air, it aſſumes a brown colour, and ſeems to be coated with oil. It dries in the air, becomes hard, brittle, ſlightly tranſparent, aſſumes a dark brown colour, and reſembles *glue.*

glue. Its fracture is then *vitreous*, or reſembles that of glaſs. Freſh gluten obſtinately retains a portion of water, to which it owes its elaſticity and tenacity. After being boiled in water, it loſes both theſe properties.

(2344.) It is ſlightly ſoluble in cold water, and is precipitated when the water is heated. When kept moiſt it ſwells, undergoes fermentation, and emits bubbles of hydrogen and carbonic acid gaſes. At the ſame time it emits the ſmell of putrefying animal bodies. Cadet kept it 24 days in a damp room. It firſt aſſumed a cruſt, which being removed, its interior was converted into a ſubſtance reſembling bird-lime. Rouelle junior aſcertained that if it be longer kept in ſuch a ſituation, it aſſumes the ſmell and taſte of cheeſe. It is blown up with cells, which contain a liquor conſiſting of ammonia and vinegar, which is commonly found in blown cheeſes.

(2345.) When kept ſome months under water it becomes ſour and fetid, ſwells, gives out carbonic acid, and riſes to the ſurface. Part of it is now diſſolved in the water, and if ſugar be added, the liquor becomes vinegar without fermentation, or admiſſion of air.

(2346.) If the bird-lime gluten of Cadet be triturated with alcohol, and then mixed with a ſufficient quantity of that liquid, a portion of it is diſſolved, and the compound forms an excellent varniſh for covering paper or wood. It may alſo be employed to cement china; and mixed with paints, eſpecially vegetable colours, it forms an excellent ground. When mixed with lime, it forms a good lute, and linen dipped into it adheres ſtrongly to other bodies.

(2347.) Acetic acid diſſolves gluten readily, and the gluten of Cadet it renders fit for making a varniſh, but not for mixing with colours. Concentrated ſulphuric acid converts gluten into charcoal, with formation of water and ammonia, while inflammable air eſcapes. Nitric acid, when heated upon it, cauſes an emiſſion of azotic gas; while oxalic and malic acids are formed, and oily flakes appear in the liquor.

(2348.) Moiſt gluten, ſuddenly dried, ſwells to a great ſize. Dry gluten burns preciſely like feathers or horn. When diſtilled, water comes over impregnated with ammonia and empyreumatic oil. The charcoal which remains, is with difficulty reduced to aſhes. While fermenting, its flames blacken ſilver and lead, ſhewing that ſulphur is preſent. Though its conſtituents have not been minutely examined, it appears to be compoſed of oxygen, hydrogen, carbon, and azote.—Theſe circumſtances have led to a concluſion that it poſſeſſes all the properties of an animal ſubſtance.

(2349.) Gluten exiſts in great abundance in wheat, and may eaſily be extracted from its flour. It has alſo been found in a great variety of other ſeeds, in the roots of many plants, and in all the leaves of plants which have been examined. It is found in the berries of many plants, ſuch as thoſe of the elder, the grape, &c. Prouſt did not find any of it in the potatoe. This ſubſtance ſeems to be the baſis of bread, and of yeaſt. The vinous fermentation ſeems to be cauſed by the reciprocal action of gluten and of ſugar upon each other. When the juice of the grape is deprived of its gluten, it does not ferment into wine; when this ingredient is reſtored, it ferments readily.

XII. ALBUMEN.

(2350.) This name has been aſſigned to the whites of eggs, and to all glary taſteleſs ſubſtances which, like them, coagulate when heated nearly to the boiling point. In 1780, Scheele affirmed that many plants contained a ſubſtance analogous to curd. Vauquelin lately diſcovered that albumen abounded in the juice of the papaw-tree, the *carica papaya* of botaniſts, which grows in Peru, and the Iſle of France. Prouſt has aſcertained that almonds and other kernels from which emulſions are made, contain a ſubſtance reſembling curd. Now curd and albumen ſeem nearly allied; but as we ſhall have occaſion to treat of albumen under the head of animal ſubſtances, we forbear entering into a deſcription of its properties in this place.

XIII. FIBRIN.

(2351.) The ſubſtance of which the fibrous part of the muſcles of animals is compoſed, and which is found in their blood, has been diſtinguiſhed by this name. Vauquelin found a ſubſtance every way reſembling animal fibrin in the juice of the papaw tree, which contains ſo much albumen. Fibrin is then proved to be a vegetable as well as an animal product; but its properties will be conſidered under animal ſubſtances.

XIV. GELATINE.

(2352.) This name has been applied by chemiſts to the animal ſubſtance which is commonly known by the name of glue. Fourcroy and Vauquelin lately found in the pollen of the *phœnix dactilifera*, or date tree, a ſubſtance reſembling animal glue. The pollen was digeſted in cold water, the liquid evaporated, and a brown ſubſtance remained. Part of this diſſolved in water, another in alcohol, and a part remained inſoluble in both.—But this ſhall be conſidered under animal ſubſtances.

XV. BITTER PRINCIPLE.

(2353.) Many vegetable ſubſtances have an intenſely bitter taſte, and are uſed in medicine, by brewers, &c. This is particularly the caſe with the *quaſia amara* and *excelſa*, the common *quaſſia* of the ſhops; with the roots of the *gentiana lutea*, common *gentian*; the leaves of *humulus lupulus*, the *hop*; the bark and wood of *ſpartium ſcoparium*, common *broom*, the flowers and leaves of *anthemis nobilis* or *chamomile*; and many others unneceſſary to be mentioned. This has led chemiſts to ſuppoſe that the peculiar taſte, and effects, of theſe ſubſtances were owing to a diſtinct ſpecies of matter, which they diſtinguiſh by the name of the *bitter principle*. It is certain however, that there are ſhades of difference between the bitters extracted from different vegetables, and it is not certain if the bitter principle has been obtained free of all extraneous mixture.

(2354.) What is reckoned the pureſt is obtained by digeſting quaſſia ſome time in water, and then evaporating to dryneſs by a low heat. A browniſh yellow ſubſtance is left, ſomewhat tranſparent, without ſmell, but of a very bitter taſte. At firſt it is ductile, but at laſt becomes brittle. It is very ſoluble in water and alcohol. It is only precipitated from ſolution by nitrate of ſilver, and acetate of lead; and the laſt is uſed as a teſt to detect the bitter principle in liquids.

(2355.) A ſecond ſpecies approaches, in its properties, to artificial tannin, and is diſtinguiſhed by ſtriking a green colour with iron, and by precipitating this metal from concentrated ſolutions. Bouillon la Grange found this ſpecies in the flowers of the *arnica montana.* It is alſo thought to exiſt in the *abſynthium vulgare,* (worm-wood,) *juniperus ſabinus,* (ſabine), *ruta graveolens,* (rue), *anthemis nobilis* (chamomile), *achillea millefolium,* (milfoil).

(2356.) The third ſpecies is artificial, and it may be obtained by treating the white willow with nitric acid. Mr Hatchett lately obtained it by treating indigo with the ſame acid. It is of a deep yellow colour, and of a very bitter taſte. Is ſoluble both in water and in alcohol, and poſſeſſes the property of dyeing ſilk, woollen cloth, and cotton, of a permanent yellow colour. It poſſeſſes many properties of an acid, cryſtallizes in elongated plates, and forms with alkalies cryſtallizable ſalts. With potaſh it forms cryſtals leſs ſoluble than pure bitter principle, which burn like gunpowder when thrown upon ignited charcoal, and fulminate loudly, with a purple light, when ſtruck upon an anvil. Ammonia deepens its colour, and produces a copious depoſition of fine yellow ſpicular cryſtals. It is probable this bitter is nearly allied to artificial tannin.

XVI. Tannin.

(2357.) We had occaſion to treat very fully of this ſubſtance when diſcuſſing the vegetable acids. As it renders gelatine inſoluble in water, it is much employed in the converſion of ſkins into leather. See Tanning and Leather. It abounds chiefly in the inner bark of trees. The epidermis ſeldom contains any. It is alſo found in the ſap, the wood, and leaves of a conſiderable number of trees. Mr Biggin obſerved that barks of trees vary in their quantity of tan at different ſeaſons.

(2358.) The following Table, conſtructed by Mr Davy, exhibits the quantity of ſolid matter extracted by water from different vegetable ſubſtances, and the proportion of tan which that ſolid matter contained.

One Ounce of	Solid Matter. Grains.	Tan. Grains.
White inner bark of old oak	108	72
.... young oak	111	77
.... Spaniſh cheſnut	89	63
.... Leiceſter willow	117	79
Coloured or middle bark of oak	43	19
.... Spaniſh cheſnut	41	14
.... Leiceſter willow	34	16
Entire bark of oak	61	29
.... Spaniſh cheſnut	53	21
.... Leiceſter willow	71	33
.... elm	—	13
.... common willow	—	11
Sicilian ſumach	165	78
Malaga ſumach	156	79
Souchong tea	—	48
Green tea	—	41
Bombay catechu	—	261
Bengal catechu	—	231
Nutgalls	180	121

XVII. Extractive Principle.

(2359.) Chemiſts have long applied the name of *extract,* or *extractive,* to all thoſe ſubſtances which were obtained from plants by means of water, and which, after the water was evaporated, remained in a dry ſtate. But the term is now taken in a more limited ſenſe, and as the term formerly included gum jelly, and various other bodies, it ſeems now reſtricted to ſuch of the colouring matters of plants as can be extracted by water. But as this extract has not been obtained in a pure ſtate, *extractive principle* is preferred, which indicates the ſubſtance which conveys to the extract its diſcriminating properties.

(2360.) According to Hermbſtadt, this principle is obtained in greateſt purity by infuſing ſaffron ſome time in water, filtering the ſolution, and evaporating to dryneſs. The ſolution, from whatever plant obtained, is always coloured. Extractive principle is ſoluble in water and alcohol, but not in ether. When the water is ſlowly evaporated, the extract obtained is ſolid and tranſparent; but when the evaporation is rapid, it is opaque. It has always a ſtrong taſte, which differs according to the plant from which it is obtained. In conſequence of repeated ſolutions and evaporations, it acquires a deeper colour, and ceaſes to be ſoluble in water. This is ſuppoſed to be owing to the abſorption of oxygen from the atmoſphere, for which this principle has a ſtrong affinity. If left expoſed to the atmoſphere, it putrifies and is deſtroyed. When oxymuriatic acid is poured into a ſolution of this principle, it imparts to it oxygen, and a dark yellow precipitate is thrown down, which is inſoluble in water, but ſoluble in hot alcohol.

(2361.) This principle unites with alumina, and forms an inſoluble compound. This is the reaſon why alum is ſo much uſed for fixing colours upon cloth. The colour is combined with ſome ſubſtance which decompoſes alum, and the cloth being previouſly dipped in a ſolution of alum, when preſented to the colour in ſolution, a mutual decompoſition enſues. The acid of the alum combines with the ſolvent of the colour, while the colour combines with the alumina, already adhering to the cloth, producing a triple compound of cloth, alumina, and colour. For many operations acetate of alumina is preferable to common alum. The alkalies readily form ſoluble compounds with extractive. Muriate of tin is often uſed inſtead of alum to fix colours, and it operates in the ſame manner. But it has been lately found that if the cloth be previouſly ſoaked in oxymuriatic acid, and then dipped in ſolution of extractive, the colour becomes more effectually fixed in the cloth than if either alumina, or oxide of tin had been employed. It would hence appear that no other mordant is neceſſary to fix the colours of extractive, than combining them with oxygen. Many of the metallic ſalts combine with extractive, as well as muriate of tin, and precipitate it from ſolution. Moſt of the oxides produce the ſame effect.

(2362.) Extracts yield, by diſtillation, an acid liquor impregnated with ammonia. Lime cauſes their ſolution to exhale the ſmell of ammonia, and ammonia precipitates from the ſame ſolution lime combined with inſoluble extractive. It has been obſerved that this principle is more abundant in old than in young plants. There are doubtleſs various ſpecies of extractive, which differ according to the plants from which they are derived. But theſe differences have not yet been ſufficiently aſcertained. It is found in the ſap of many trees, and may be precipitated by oxymuriatic acid. It has been found in all the barks which have been examined, and in many leaves, ſuch as thoſe of ſenna. It abounds in catechu, and in ſaffron, as has already been remarked. Its ſimilarity to the colouring matter of plants has already been pointed out; and, perhaps, theſe two principles may yet be found to be the ſame.

XVIII. Narcotic Principle.

(2363.) It is well known that the milky juices of the poppy, the lettuce, and other plants; and the decoction of others, as of the leaves of the *digitalis purpurea*, excite ſleep, and if taken in ſufficient quantity, produce death. This has led to a ſuppoſition that there is ſome peculiar ſubſtance in theſe plants which, though mixed with other materials, produces the effects deſcribed. To this ſubſtance has been annexed the name of the *narcotic principle*. A ſubſtance being extracted from opium, which poſſeſſes theſe properties in the higheſt degree, this ſubſtance is held to be the narcotic principle in the higheſt degree of purity.

(2364.) Opium is obtained from the *papaver album*, or white poppy, which is cultivated in Egypt, and in many of the Aſiatic nations. The poppies are planted in fertile ſoil, and well watered. After the ſeed capſules have attained nearly their full ſize, longitudinal inciſions are made in them during three or four ſucceſſive evenings. From theſe a milky juice iſſues, which ſoon concretes, and being ſcraped off, and wrought into cakes, forms the opium of commerce.

(2365.) Opium is a tough brown ſubſtance, has a peculiar ſmell, and an acrid nauſeous bitter taſte. It burns readily and ſtrongly, and is a compound of various ſubſtances, namely ſulphates of lime and potaſh, oil, reſin, extractive matter, gluten, &c. Digeſted in water, ſeveral of its conſtituents are diſſolved; and when it is evaporated to the conſiſtence of ſyrup, a precipitate appears, which is increaſed by diluting the ſolution with water. The precipitate conſiſts chiefly of reſin, oxygenized extractive, and narcotic principle. This being digeſted in alcohol, the reſin and narcotic principle only are diſſolved. The narcotic principle falls in cryſtals as the ſolution cools, but ſtill coloured with reſin. But by repeated ſolutions and cryſtallizations, it may be obtained tolerably pure. If the reſiduum of opium which remains undiſſolved by water, be digeſted in alcohol, a conſiderable portion of narcotic principle is obtained, combined with reſin. This alſo may be purified by repeated cryſtallizations.

(2366.) In its pureſt ſtate, the narcotic principle is of a white colour. It cryſtallizes in rectangular priſms with rhomboidal baſes. It has neither taſte nor ſmell. It is ſoluble in about 400 parts of boiling water, but is inſoluble in cold water. It is ſoluble in 24 parts of boiling alcohol, and in 100 parts of cold alcohol. Hot ether diſſolves it, but drops it when it cools. Heated it melts like wax, yields a yellow acrid, and aromatic oil, ſome water, and carbonate of ammonia. At laſt carbonic acid gas, carbureted hydrogen gas, and ammonia come over. A bulky coal is left, which contains ſome potaſh. It is ſoluble in all the acids, from which it is precipitated by the alkalies.

(2367.) Déroſne tried it upon dogs and found it to be more powerful than opium. Its bad effects were counteracted by cauſing the animals to ſwallow vinegar. Déroſne ſuppoſes that the vinegar operates by diſſolving the narcotic principle; and vinegar is known to counteract the effects of opium when taken in exceſs.

(2368.) Our garden poppies, treated in the way deſcribed, yield a juice from which opium might be made. The ſeeds of field poppies, when ground among corn into meal, have been known to induce ſleep. If inciſions be made in the *lactuca viroſa* and *ſativa*, or garden lettuce, when it is running to ſeed, it yields a milky juice, from which, Dr Coxe of Philadelphia affirms, as good opium may be made as from the poppy. The leaves of the *atropa belladonna*, or *deadly nightſhade*, are very narcotic, and if taken in too great quantity, occaſion death. The leaves of the *digitalis purpurea*, or *fox-glove*, are ſtill more powerful, and like ſome other poiſonous narcotics, promote the diſcharge of urine. To theſe may be added *hyoſycamus niger*, or *ben-bane*; *conium maculatum*, or *bemlock*; *daturum ſtramonium*; *ledum paluſtre*; *prunus laurocera ſus*; and the leaves of *nicotiana tabacum*, or tobacco. Opium, and its ſolution in alcohol called *laudanum*, being powerful medicines when prudently uſed, has induced many of the chemical phyſicians to inveſtigate its properties. Opium is chiefly cultivated in thoſe nations where the Mohammedan religion prevails. Mohammed having prohibited the uſe of wine, his votaries betook themſelves to opium as a ſubſtitute; and of the two modes of intoxication that by opium is certainly more pernicious than that by wine.

XIX. Oils.

(2369.) In treating of oils it was ſtated that they are of two kinds, the *fixed* and *volatile*. Fixed oil is only found in the ſeeds of plants, and is almoſt entirely confined to thoſe ſeeds which have two cotyledons. It is ſometimes, though rarely, found in the pulp which encloſes the ſtone of certain fruits. This is the caſe with olive oil, the moſt valuable of any of the fixed oils. Volatile oils are found in all parts of different plants, except in the cotyledons of the ſeeds. It is to theſe that different plants, and parts of plants, owe their peculiar ſmell. To enumerate the volatile oils would be a Herculean taſk, as every odoriferous plant may be made to yield a volatile oil.

XX. Wax.

(2370.) It is well known that bees poſſeſs the power of forming wax, which Huber aſcertained they can do from honey or ſugar. But this ſubſtance is alſo a vegetable product, and ſome plants yield it in ſuch abundance that it might be profitably extracted from them. It coats the ſurface of the leaves of many trees, and the leaves being bruiſed, and digeſted firſt in water, then in alcohol, until all that is ſoluble in theſe liquids be extracted from them, the inſoluble part is mixed with ſix times its weight of pure ammoniacal ſolution, which diſſolves the wax. The ſolution being filtered, the ammonia is ſaturated with diluted ſulphuric acid, with conſtant ſtirring, which precipitates the wax in yellow powder. After being well waſhed, it is melted over a gentle fire.

(2371.) Wax is bleached, and acquires a pure white colour by expoſing it in thin ſlices to the atmoſphere. It has then hardly any ſmell, and its ſpecific gravity is from 0·8203 to 0·9662. It is inſoluble in water; melts at 155°. At a greater heat it boils and flies off in vapour. An ignited body ſets the vapour on fire, and this property renders wax very uſeful for making candles. Wax is ſoluble in boiling alcohol, and in heated ether. With the fixed oils it forms the compound called *cerate*, much uſed by ſurgeons, and whoſe conſiſtency varies according to the proportion of oil. It alſo diſſolves in heated oil of turpentine, and other volatile oils, and a part precipitates on cooling. With the fixed alkalies it forms ſoap, and with volatile alkali a ſoapy emulſion, ſcarcely ſoluble in water. The acids have little action on wax, and the oxymuriatic acid only bleaches, or renders it white. Hence wax is much employed as a lute to confine acids in veſſels. From an experiment of Lavoiſier it would appear that wax is compoſed of

82·28	parts carbon
17·72	hydrogen
100·00	

It probably contains alſo a portion of oxygen. As the abſorption of oxygen renders the fixed oils concrete, wax is ſuppoſed to be a fixed oil which has become concrete by being ſaturated with oxygen.

(2372.) In Louiſiana and other parts of North America, a pale green wax is obtained from the berries of the *myrica cerifera*, which are boiled and ſqueezed in water. The wax is melted, and ſwims on the ſurface, where it is ſkimmed off. The Chineſe extract wax from various vegetables; and it is now thought to be a very abundant product of the vegetable kingdom.

XXI. Camphor.

(2373.) Newmann firſt demonſtrated this to be a diſtinct vegetable ſubſtance. It has long been known in the Eaſt, and was firſt brought to Europe by the Arabians. It is obtained in Japan by diſtilling the wood of the *laurus camphora*, in large iron pots, along with water. To the pots are fitted earthen heads ſtuffed with ſtraw. The camphor ſublimes, and concretes upon the ſtraw. The Dutch ſubject it to a ſecond ſublimation in glaſs veſſels of a turnip ſhape, having a ſmall mouth covered with paper. When ſublimed in cloſe veſſels it cryſtallizes in hexagonal plates, or pyramids.

(2374.) Refined camphor is a white brittle ſubſtance of an acrid taſte, and aromatic odour. Its ſpecific gravity is 0·9887. It is ſo volatile that when expoſed in open veſſels in hot weather, it goes entirely off in vapour. It is inſoluble in water, but communicates to it its peculiar ſmell. Rectified alcohol diſſolves three-fourths of its weight of camphor, which is precipitated by adding water. When camphorated alcohol is diſtilled, the ſpirit paſſes over firſt, leaving the camphor; and this affords an eaſy way of purifying camphor. Camphor is alſo ſoluble in the fixed and volatile oils. Acids diſſolve camphor with efferveſcence, and it may be precipitated from the recent ſolution unaltered. Mr Hatchett, by digeſting ſulphuric acid on camphor, and afterwards diſtilling the compound, converted it into a yellow oil, charcoal, a reſinous ſubſtance reſembling artificial tannin. Nitric acid converts camphor into a yellow ſubſtance reſembling oil, which is called *oil of camphor*. With acetic acid it forms the compound called *aromatic vinegar*.

(2375.) When ſuddenly heated, camphor melts at 300°, according to Venturi, and at 421° according to Romini. It is very inflammable, and burns with much flame, without leaving a reſiduum. It even burns on the ſurface of water. Bouillon la Grange thinks camphor is compoſed of volatile oil and charcoal, and that its ultimate ingredients are carbon and hydrogen, the proportion of carbon being much greater than in oils.

(2376.) Camphor has been found to exiſt in all the volatile oils that have been examined, and is ſuppoſed to communicate to them their peculiar ſmell. If a volatile oil be expoſed to the air at a temperature between 22° and 54°, part of the oil evaporates, and camphor cryſtallizes. Or if the oil be diſtilled in a water-bath ſome degrees below the boiling point, until a third of the oil is forced over, camphor is found cryſtallized in the ſtill. If this be removed, and the oil again diſtilled, more camphor cryſtallizes; and in this way all the camphor may be ſeparated from the oil. The camphor thus obtained is purified by mixing it with a little dry lime and ſubliming it. This differs from common camphor in not forming a liquid ſolution with the ſulphuric and the nitric acids; and it is precipitated from the latter acid in a glutinous maſs.

(2377.) Mr Kind of Eutin having paſſed a ſtream of muriatic acid gas through oil of turpentine, in a Woulfe's bottle, converted nearly one half of the oil into camphor. The proportion of gas which anſwers beſt is what can be ſeparated by ſulphuric acid and heat from a quantity of common ſalt equal in weight to the oil of turpentine employed.

(2378.) Camphor is much uſed in medicine as a powerful ſtimulant, and peculiarly efficatious in diſeaſes of the urinary organs. It is ſometimes ſerviceable in mania, and powerfully promotes ſleep. It proves deſtructive to many ſpecies of inſects, and the gall plant, which contains camphor, is commonly called *flea-bane* in this country from the uſe to which it is ſometimes applied.

XXII. Bird-lime.

(2379.) This viſcous ſubſtance exudes from the bark and leaves of ſeveral plants. It is ſaid to abound in the berries of the miſletoe. It is uſually prepared by boiling the middle bark of the holly, ſeven or eight hours, until it becomes ſoft. It is then put into a hole in the earth, covered with ſtones, and left to ferment or rot for a fortnight or three weeks. This fermentation changes it to a mucilaginous conſiſtency; and it is now pounded to a paſte in mortars, and well waſhed with river water. It is ſoluble in ether, and in boiling alcohol. Its colour is greeniſh, its flavour ſour, its conſiſtence gluey, ſtringy, and tenacious. It has hence been much employed in catching ſmall birds. It reddens vegetable blues. It ſoftens, but does not diſſolve in boiling water. Concentrated ſolution of potaſh forms a ſpecies of ſoap with bird-lime.

XXIII. Resins.

(2380.) Reſins derived their name from common *roſin*, which is the moſt abundant of any of this claſs of ſubſtances. Reſins are ſuppoſed to have the ſame relation to the volatile which wax has to the fixed oils, and to be formed in conſequence of a combination of oxygen with volatile oils. Accordingly when a volatile oil is long expoſed to the air it acquires the properties of a reſin, in conſequence, it is thought, of its combining with oxygen. The ſame change takes place more rapidly when oil of turpentine is expoſed to oxymuriatic gas. It is ſoon converted into a yellow reſin. Reſins often exude ſpontaneouſly from trees or flow from artificial wounds. They are frequently at firſt combined with a volatile oil from which they are ſeparated by diſtillation. They are ſolid brittle ſubſtances, commonly of a yellow colour. Their taſte reſembles that of volatile oils, but they have no ſmell unleſs they contain foreign ingredients. They are all heavier than water. They are all non-conductors of electricity, and by friction are electrified negatively.

(2381.) When heated they melt, and when ignited, they burn with a yellow flame, emitting at the ſame time much ſmoke. They are inſoluble both in hot and in cold water, but when they are melted in water, or combined with volatile oil and diſtilled with water, they become opaque and leſs brittle than formerly. This every ſhoemaker knows who prepares his roſin by working it in warm water.

(2382.) They are, with only two exceptions, ſoluble in alcohol, eſpecially when it is heated, which takes up about one third of its weight of reſin. If the alcohol be diſtilled off, the reſin remains unchanged. Or if water be poured into the ſolution, the reſin falls in the ſtate of a white powder. They are alſo ſoluble in ſulphuric ether. Moſt of them are ſoluble in the fixed oils, and eſpecially in the drying oils. They are alſo generally ſoluble in oil of turpentine and other volatile oils. They are ſoluble in the fixed alkaline ſolutions, and hence the ſoap manufacturers put a quantity of roſin in their ſoap, which gives it a yellow colour, a peculiar ſmell, and renders it more ſoluble in water. In volatile alkali they only form an imperfect ſolution.

(2383.) Mr Hatchett firſt diſcovered that reſins are ſoluble in acids. Sulphuric acid being poured on them in powder, firſt diſſolves the reſins, and by the aſſiſtance of heat, gradually converts them into artificial tannin and charcoal, which burns like mineral coal. The compound being waſhed, and the tannin ſeparated by alcohol and water, from 100 grains of the following reſins, Mr Hatchett obtained the following proportions of charcoal by this proceſs;

Copal	67 grains.
Maſtich	66
Elemi	63
Tacamahac	62
Amber	56
Roſin	43

The ſame bodies when expoſed to a red heat in cloſe veſſels yield very little charcoal. The following is the quantity obtained by Mr Hatchett from 100 grains of ſeveral of them.

Maſtich	4·50 grains
Amber	3·50
Roſin	0·65

(2384.) Nitric acid of the ſpecific gravity 1·38, diſſolves reſin with the aſſiſtance of heat, and changes its nature. It is precipitated by water. If the acid be in ſufficient quantity, and be long digeſted on a reſin, a yellow viſcid ſubſtance is obtained which is equally ſoluble in water and alcohol. At laſt the nitric acid converts reſin into artificial tannin. Muriatic acid alſo diſſolves reſins ſlowly. Mr Hatchett recommends acetic acid as an excellent ſolvent of reſins for vegetable analyſis.

(2385.) By deſtructive diſtillation reſins yield carbureted hydrogen gas, carbonic acid gas, ſome acidulous water, and much empyreumatic oil. When volatile oil is expoſed to the air it is partly converted into reſin, partly into the benzoic or camphoric acids, while a portion of water is alſo formed. It has hence been inferred that reſin conſiſts of volatile oil, combined with oxygen, and deprived of a portion of its hydrogen. To know if any ſubſtance contains reſin, pour ſulphuric ether upon it in powder, and expoſe it to the light. If reſin be preſent, the ether will aſſume a brown colour. We ſhall now enumerate a few of the more uſeful reſins.

(2386.) *Roſin* is obtained from the *pinus ſylveſtris*, or Scotch fir, from the *pinus abies* or ſpruce fir, from the *larix*, and *balſamea*. When the bark is ſtripped from the fir trees in winter, they become encruſted with a white brittle ſubſtance conſiſting of roſin united to a ſmall portion of oil. The yellow roſin is made by melting and agitating this ſubſtance in water, and it is more ductile than the others becauſe it contains a ſmall portion of oil. The *larix* yields Venice turpentine, the *balſamea* the balſam of Canada.

(2387.) *Maſtich* is obtained from the *piſtacia lentiſcus*, a tree which grows in the Levant, and particularly in the iſland of Chios. Tranſverſe inciſions are made in the tree, from which a juice exudes, which concretes into this reſin. It contains nearly a fifth of caoutchouc, from which the reſin may be ſeparated by ſolution in alcohol. It is chewed in Turkey, as we chew tobacco, and is often employed by ſurgeons to fill up the vacuities of carious teeth.

(2287.) *Sandarach* is obtained from the *juniperus communis*, or common juniper. It exudes ſpontaneouſly, and is ſoluble in about eight times its weight of water, but is not ſoluble in tallow or oil. It is alſo ſoluble in acids and alkalies.

(2389.) *Elemi* is obtained from the *amyris elemifera* a tree which grows in Canada, and Spaniſh America. Inciſions being made in the bark, during dry weather, the reſin exudes, and is allowed to harden in the ſun. It has a ſtrong and fragrant ſmell, which gradually diminiſhes.

(2390.) *Tacamahac* is obtained from the *fagara octandra*, a tree, which grows in America. It has an aromatic ſmell, and is ſoluble in alcohol, but not in water.

(2391.) *Animé* is obtained from the *hymenæa courbaril*, or locuſt tree, which grows in North America. It very much reſembles copal, but is eaſily ſoluble in alcohol, which copal is not. It is much employed in making varniſhes, owing to its ſolubility in alcohol.

(2392.) *Ladanum* or *labdanum* exudes from the *ſiſtus creticus*, a ſhrub which grows in Syria and the Grecian iſlands. Water diſſolves about $\frac{1}{12}$th of it, which ſeems to be gum. Part of the remainder is ſoluble in alcohol. It generally contains about $\frac{1}{4}$th of its weight of extraneous matters.

(2393.) *Botany Bay reſin* is obtained from the *acarois reſinifera*, a ſingular ſort of tree which grows near Botany Bay, and other parts of New South Wales. It exudes ſpontaneouſly, or from wounds made in the bark of the tree. Two-thirds of it are ſoluble, by digeſtion, in alcohol. The remaining third is extractive matter ſoluble in water, and woody fibre. It is partially ſoluble in alkaline ſolutions, and it burns like roſin.

(2394.) *Black popular reſin* was firſt pointed out by Schrœder, who obtained it from the buds of the black poplar, by boiling them in water, and afterwards preſſing them. The buds yield about $\frac{1}{4}$th of their weight of this reſin, which is very ſimilar to the reſin of Botany Bay.

(2395.) *Green reſin*, conſtitutes the colouring matter of the leaves of trees, and of almoſt all plants. It is inſoluble in water, but ſoluble in alcohol, by which it may be extracted from the leaves of plants. If the leaves be immerſed in oxymuriatic acid, they ſoon aſſume a withered appearance, but the colouring matter acquires the properties of reſin in greater perfection.

(2396.) *Copal* is ſaid to be obtained from the *rhus copallinum*, a tree which abounds in ſeveral parts of North America. It is ſaid alſo to be produced from various trees in Spaniſh America. It is a white ſubſtance, ſometimes opaque, often nearly tranſparent. It has long been reckoned a gum, becauſe it is of difficult ſolution in alcohol, oil of turpentine, and in the fixed oils. But it melts when heated, and as Mr Hatchett diſcovered, is ſoluble in acids and in alkalies. With nitric acid it forms artificial tannin, and exhibits all the uſual properties of the reſins. It is therefore now claſſed with the reſins. If copal be ſuſpended by a thread above the ſurface of alcohol, in a cloſe veſſel, well corked, and the alcohol raiſed in vapour by the heat of a ſand-bath, the copal melts, and drops like oil into the alcohol, and is ſuddenly diſſolved. After the drops ceaſe to be diſſolved by the alcohol, it is unneceſſary to continue the proceſs, becauſe the alcohol is now ſaturated with the copal. By a ſimilar proceſs copal may be combined with oil of turpentine. Copal was firſt uſed as an ingredient in varniſhes by the French. It afterwards found its way into Holland, where the mode of preparing it was much improved. But the modes by which it is prepared have hitherto been kept a ſecret among workmen, and are hardly known in the Britiſh iſles.

(2397.) *Lac.*—Though this ſubſtance has long been known in the arts, very little is known reſpecting its origin. It is ſaid to be depoſited on various ſpecies of trees in the Eaſt Indies, by an inſect called *thremes lacca*. It ſeems to form the neſts of theſe inſects, and it appears doubtful whether it be formed in their bodies, or be merely an exudation occaſioned by their punctures in the tree. In its original ſtate it is called *ſtick-lac*, which is of a deep red colour. When broken, and boiled in water, the water diſſolves a great part of this colouring matter, and the decoction is uſed as a red dye. What remains undiſſolved is called *ſeed-lac*, which is of a brown colour. Alcohol diſſolves the greateſt part of what the water has left. What the water leaves melts by heat, and being formed into thin plates is known under the name of *ſhell-lac*.

(2398.) To Mr Hatchett we are indebted for an accurate analyſis of the three ſpecies of lac, and the following Table exhibits his reſults in parts of a 100.

Table.

	Stick Lac.	*Seed Lac.*	*Shell Lac.*
Reſin, ...	68	88·5	90·9
Colouring matter,	10	2·5	0·5
Wax, ...	6	4·5	4·0
Gluten, ...	5·5	2·0	2·8
Foreign bodies, .	6·5		
Loſs, ...	4·0	2·5	1·8
	100·0	100·0	100·0

(2399.) Lac is of very extenſive uſe in India. In Europe, beſides furniſhing a red dye, it forms the baſes of ſealing wax. Black wax is formed by melting certain proportions of ſhell lac with oil of turpentine, and ſtirring into the ſolution a ſufficient quantity of ivory black. Red wax is formed in the ſame manner, with vermilion to give the colour. A portion of bleached bees-wax is often uſed to ſave the expenſe of lac.—This ſubſtance alſo makes a conſpicuous figure in the compoſition of varniſhes. A ſolution of a 100 grains of lac in 4 ounces of water, in which 20 grains of borax are alſo diſſolved, and a ſufficient quantity of lamp black is ſtirred in the mixture, conſtitutes Chineſe Ink.

(2400.) *Amber* is thought to be of vegetable origin, and though it differs from reſin in ſome particulars, it agrees with it in moſt of its properties. It is a light, hard and brittle ſubſtance, of a yellow colour, and nearly tranſparent. Though uſually taſteleſs, and without ſmell, it emits a fragrant odour when pounded or heated. It cannot be melted without loſing weight, and changing its appearance. In a ſtrong heat it burns, leaving a ſmall quantity of aſhes. It is not ſoluble in water, but diſſolves, after long digeſtion, in alcohol. A reſiduum is left which is not acted on by alcohol. A boiling ſolution of the fixed alkalies converts amber into ſoap. It is alſo ſoluble in weak ſolution of potaſh, after very long digeſtion. Sulphuric acid converts it into a black reſinous ſubſtance. Nitric acid, with heat, exhibits the ſame phenomena with it as with the other reſins. It only combines with the fixed and volatile oils after being roaſted, or melted by heat. In this caſe the ſolution forms *amber varniſh*.

(2401.) *Reſin from bitumen.*—Mr Hatchett aſcertained that when mineral bitumen, ſuch as that which is diſtilled from pit-coal, is digeſted in nitric acid, it acquires the properties of a reſin. Its fracture is then dark brown, and it acquires a reſinous luſtre.

Varnishes.

(2402.) As reſins form the baſis of varniſhes, it may not be improper to conclude this branch of the ſubject with a ſhort account of thoſe which are in moſt frequent uſe.—The object of varniſhes is to prevent the action of air and water on the varniſhed bodies. In moſt caſes it is alſo deſireable that they ſhould be tranſparent, ſo as not to obſcure the colours of the bodies to which they are applied. They ſhould not crack nor ſcale off, and they ſhould be ſuſceptible of a fine poliſh. It is alſo neceſſary that the ſolvent of the reſin uſed as a varniſh, ſhould be capable of drying. The ſolvents uſually employed in making varniſhes, are alcohol which forms what are called *drying varniſhes*, volatile or eſſential oil, which forms what are called *eſſential varniſhes*, and the drying fixed oils which form the *fat varniſhes*.—Frequently more than one ſolvent, and different reſins are mixed in the ſame varniſh. Powdered glaſs is alſo recommended by Mr Tingry to give them more conſiſtency. The mixture is commonly made in a glaſs matraſs immerſed in a veſſel of boiling water, and is ſtirred with a ſtick until the combination be completed. The materials, when neceſſary, are previouſly liquified in ſeparate bottles by expoſing them to the ſteam of boiling water. After the combination is effected, the varniſh is poured off, and filtered through cotton.

(2403.) Chaptal, in his *Chemiſtry applied to the Arts*, recommends, on the authority of Tingry, the following varniſhes, which dry of themſelves.

(2404.) A very brilliant varniſh for paſteboard, boxes, pen-caſes, &c.

	oz.
Pure Maſtic	6
Sandarach	3
Pulveriſed glaſs	4
Venice turpentine	3
Alcohol	32

(2405.) An equally brilliant and harder varniſh, for carriages, door and window frames, &c. is made by

	oz.
Copal after it has been melted by a gentle heat, and poured into water	3
Sandarach	6
Pure maſtic	3
Pulveriſed glaſs	4
Pure turpentine	2½
Alcohol	32

(2406.) An equally brilliant, but more pliabl and ſolid varniſh is obtained from

Sandarach	6 oz.
Elemi	4
Animé	1
Camphor	½
Alcohol	32

(2407.) For wainſcot, iron-work, grates, balluſtrades, &c.

	oz.
Sandarach	6
Shell-lac	2
Roſin	4
Pure turpentine	4
Powdered glaſs	4
Alcohol	32

(2408.) For waxing tables and other furniture, melt over a ſlow fire.

	oz.
White wax	2
Add eſſence of turpentine previouſly liquified	4

—continue to ſtir until the compoſition become cold. This mixture, being rubbed upon furniture, conveys all the brilliancy of the fineſt varniſh.

(2409.) For violins, and inſtruments compoſed of roſe wood, acajou, or plumbtree, and particular kinds of furniture.—

Seed lac	2 oz.
Sandarach	4
Maſtich	1
Benzoin	1
Turpentine	2
Alcohol	32

(2410.) Various colouring ſubſtances, ſuch as gamboge, dragon's blood, turmeric, ſaffron, &c. may be mixed in the compoſition of varniſhes, ſo as to convey any particular colour to the bodies which they cover.—The following compoſition forms a varniſh of a beautiful golden orange colour.—Twelve grains of oriental ſaffron, and three fourths of an ounce of turmeric, being infuſed during 24 hours in 20 ounces of alcohol pour this infuſion into a well pulveriſed mixture of

Sandarach	2 oz.
Elemi	2
Dragon's blood in tears	1
Seed lac	1
Gamboge	¾

This varniſh is uſed for covering mathematical inſtruments, utenſils of copper, iron, and ſteel. When applied to metals they ſhould be previouſly heated.

(2411.) A beautiful golden colour may alſo be conveyed to vaſes, and utenſils formed from the various compoſitions of copper, known by the name of braſs. &c.

		oz.	grs.
Amber	triturated on porphyry	2	—
Gamboge		2	—
Seed lack		6	—
Dragon's blood		—	60
Extract of red ſandal		—	24
diſſolved in tincture of			
Oriental ſaffron		—	36
Alcohol		36	—

(2412.) The above are the varniſhes uſually employed when alcohol is the principal ſolvent. From ſuch varniſhes the alcohol ſoon evaporates and leaves the varniſh in a hard and brittle ſtate, apt to crack and ſcale-off, unleſs corrected by the other ingredients.—In the compoſition of the *eſſential varniſhes* the volatile oil of turpentine is commonly uſed as the principal ſolvent of the reſins. This oil, like alcohol, eſcapes in vapour; but part remains in union with the reſins, and conveys to the varniſh greater pliability, and renders the varniſh leſs apt to crack and ſcale off, than thoſe varniſhes where alcohol is the principal ſolvent. It therefore follows that varniſhes where oil of turpentine is the principal ſolvent, are beſt adapted for pictures, leather, and ſuch bodies as are expoſed to be bent, folded, or to be daſhed againſt hard ſubſtances.

(2413.) The following varniſh is recommended for pictures.

	oz.
Purified maſtick	12
Pure turpentine	1½
White glaſs pulverized	5
Camphor added in ſmall fragments after the reſins are diſſolved	0½
Rectified oil of turpentine	36

(2414.) Another varniſh for leather, wood, and metals is compoſed of

	oz.	grs.
Seed lac	4	—
Sandarach	4	—
Dragon's blood	0½	—
Turmeric	3	36
Gamboge	3	36
Pure turpentine	2	—
Pulverized glaſs	5	—
Oil of turpentine	32	—

(2415.) *Copal varniſh*, as Tingry diſcovered, may be formed by diſſolving copal in ether, in the following manner.—Half an ounce of copal, in very fine powder, is gradually dropped into a flaſk containing two ounces of ether. The flaſh is then cloſed, and agitated for about half an hour, and then left to repoſe. When afterwards agitated, if the liquid exhibit a wavy ſurface, and appear muddy, more ether muſt be added, as the ſolution is imperfect. The ether diſſolves from a fifth to a fourth of its weight of copal. The varniſh thus formed is of a pale citron colour. It is applied with a bruſh, and the ſubſtance on which it is ſpread ſhould be covered with a ſlight coating of any volatile oil, to prevent the too rapid evaporation of the ether. The oil may be afterwards wiped off by a linen cloth. This varniſh forms ſuch a hard coating on wood and metals, that it can hardly be defaced by either friction or blows.

(2416.) Copal varniſh may alſo be prepared by ſolution in the eſſential, or volatile oils. When oil of turpentine is uſed as the ſolvent, it is previouſly neceſſary to expoſe the oil to the ſun, for ſome months, in bottles cloſely ſtopped, having an empty ſpace of ſome fingers breadth between the oil and the cork. Eight ounces of this prepared oil are put into a matraſs, immerſed in boiling water, and afterwards one ounce and a half of powdered copal is gradually dropped into the matraſs, during which the matraſs is moved round among the water. After the ſolution is effected, the matraſs is removed from the bath, allowed to repoſe ſome days, and the liquid is filtered through cotton.—This varniſh has nearly the ſame properties with that which was laſt deſcribed; but its ſucceſs depends much on the ſtate of the oil employed as the ſolvent.

(2417.) Other volatile oils are uſed as helps in the ſolution of copal for varniſh.—For example two oz. of eſſential oil of lavender being heated in a matraſs over a gentle fire, one ounce of powdered copal is added in ſmall parcels, and the liquid ſtirred with a ſtick until the copal diſappears. Six ounces of oil of turpentine, heated nearly to the boiling point, are then poured in at three different times, and the mixture is ſtirred inceſſantly until the combination be completed.—This varniſh is ſolid, and of a brilliant golden colour, but leſs drying than the preceding.

(2418.) Another varniſh is prepared by putting ſix ounces of oil of lavender into a matraſs, with one dram of camphor, and heating them until they boil. Then two ounces of powdered copal are added, in very ſmall portions, with conſtant ſtirring of the liquor. After the copal is well incorporated, a ſufficient proportion of boiling oil of turpentine is gradually added, and the boiling and ſtirring are continued until the mixture has acquired the neceſſary conſiſtency.

(2419.) *Fat varniſhes* are chiefly employed to cover iron, copper, and utenſils made of other metals. The oils chiefly employed as ſolvents are lint-ſeed rendered drying by the means which were deſcribed when treating of that oil, and nut oil. A portion of oil of turpentine, or other eſſential oil, is commonly added to facilitate the drying. But the fat varniſhes are ſo ſlow in drying that the workmen are obliged to dry the articles covered with them by the heat of ſtoves.—A very good varniſh is made by adding

8 oz. boiling lintſeed oil to
16 of copal melted in a matraſs,
16 of oil of turpentine. The two firſt ingredients being well ſtirred, the matraſs is removed from the fire, and ſhaken until the heat abates. Then the heated oil of turpentine is added, the whole well ſtirred, and while yet hot is paſſed through a linen cloth. This varniſh ſhould be kept in wide mouthed bottles, and it improves by keeping.

(2420.) Another hard, durable, and beautiful varniſh may be formed by digeſting together

6 oz.	of copal
24	drying lintſeed oil
1½	Venice turpentine
6	oil of turpentine.

(2421.) Since balloons were invented many experiments have been made to procure a varniſh ſufficient to retain the gas. Caoutchouc is preferable to all known ſubſtances for this purpoſe; but as ether is the only ſolvent from which it parts with its properties unaltered, this ſolvent is too expenſive for general uſe. The method commonly adopted is to liquify the caoutchouc cut into ſmall ſlips, in a matraſs over a ſand bath, and then to add boiling lintſeed oil, and after they are well ſtirred and incorporated, heated eſſential oil is added. Each of the three ingredients are in equal proportions. After the varniſh cools, it is paſſed through a linen cloth. Lintſeed oil, and nut oil, when rendered very drying, acquire all the properties of varniſh, and are after uſed to cover balloons without any addition.

XXIV. Guaiacum

(2422.) Is obtained from the *guaiacum officinale*, a tree in the Weſt Indies, whoſe wood is uncommonly hard and heavy. It exudes ſpontaneouſly, or billets being bored longitudinally, and heated at one end, the melted ſubſtance runs out at the other. It has long been uſed in medicine, particularly in venerial complaints. It is a ſolid ſubſtance reſembling a reſin, of a mixed browniſh, reddiſh, or greeniſh colour; and it becomes green by expoſure to light in the open air. When pounded, or melted by heat, it diffuſes a fragrant odour. About nine per cent of it are ſoluble in water, and the diſſolved part poſſeſſes the properties of extractive. Alcohol diſſolves guaiacum readily. Liquid oxymuriatic acid precipitates the ſolution of a fine pale blue colour, which is permanent, and renders it probable that guaiacum contains indigo in its compoſition. It is alſo ſoluble in ſulphuric ether, and in the ſulphuric and nitric acids.—Mr Brande obtained from 100 parts of this ſubſtance by diſtillation,

Acidulous water - - -	5·5
Thick brown oil - - -	24·5
Empyreumatic oil - -	30·0
Charcoal - - - - -	30·5
Carbonic acid and carbureted hydrogen gaſes	9·5
	100·0

(2423.) This ſubſtance differs from the reſins in containing a much greater proportion of charcoal; in forming oxalic acid when treated with nitric acid, but no tannin as is the caſe with the reſins; and in the various changes of colour it undergoes, which ſeems a conſequence of combining with various proportions of oxygen.

XXV. Balsams.

(2424.) Balſams poſſeſs the general properties of reſins, but differ from them in yielding a portion of benzoic acid when heated or digeſted in acids. Though inſoluble in water, they often yield benzoic acid when boiled in that liquid. The ſtrong acids diſſolve them, and the alkalies act upon them nearly as on the reſins. Their name is derived from the celebrated *balm* or *balſam of Gilead*. They are either *liquid* or *ſolid*. The liquid balſams yet known are five in number.

(2425.) *Opobalſamum* or *balm of Gilead*, is obtained from the *amyris Gileadenſis*, a tree which grows in Arabia, eſpecially near Mecca. It is ſo much eſteemed by the Turks that little or none of it ever reaches this country. Of courſe its properties are not known in Europe, except from ſome vague reports.

(2426.) *Copaiva* is obtained from inciſions made in the trunk of the *copaifera officinalis*, a tree which grows in South America, and in ſome of the Weſt India Iſlands. It is of a yellowiſh colour, tranſparent, at firſt reſembles oil, but gradually acquires the conſiſtence of honey. It has a pungent taſte, and agreeable ſmell, and when mixed and diſtilled with water, it yields from a half, to 3¼th of its weight of volatile oil. The reſiduum is reſin. But when diſtilled from a water bath, without being mixed with water, only a few drops of oil and very little water are obtained. This led Schonberg to conclude that the balſam is decompoſed when it is diſtilled from an infuſion in water and that the oil and the reſin are formed during the proceſs. Diſtilled at the temperature of 550°, it yeilds oil, acidulous water, a ſmall proportion of carbonic acid, and much olefiant gas.—It is ſoluble in the ſulphuric and nitric acids, both of which convert it into artificial tannin. It hence ſeems nearly allied to turpentine.

(2427.) *Balſam of Tolu* is obtained from inciſions made in the bark of the *toluifera balſamum*, a tree which grows in South America. It has a fragrant ſmell, is of a reddiſh brown colour, and by age becomes ſolid and brittle. Diſtilled with water, it yields very little volatile oil, but conveys to the water its taſte and ſmell. If the diſtillation be long continued, benzoic acid ſublimes. Mr Hatchett found it to be ſoluble in the alkalies, and that when diſſolved in the ſmalleſt poſſible quantity of ſolution of potaſh, it loſt its own ſmell, and aſſumed a moſt delicious odour, reſembling that of clove pink. This ſmell he found to be permanent, and hence this preparation ſeems likely to anſwer as a perfume. Sulphuric acid, by digeſtion, converts about 54 *per cent.* of this ſubſtance into charcoal. A portion of artificial tannin is formed, and a conſiderable quantity of pure benzoic acid ſublimes. Nitric acid acts upon it nearly in the ſame way as upon the reſins. Benzoic acid ſublimes, and by repeated digeſtions it is converted into artificial tannin.

(2428.) *Balſam of Peru* is obtained by boiling in water the twigs of the *myroxylon peruifera*, a tree which grows in the warm parts of South America, and which abounds in reſin. Its taſte is hot and acrid, its ſmell agreeable, its colour brown, and its conſiſtence that of honey. Water, in which it has been boiled ſome time, depoſits on cooling, cryſtals of benzoic acid. Diſtilled from a ſand bath, with a heat gradually raiſed, ſome benzoic acid is firſt ſublimed; next ſome water and oil come over. At 550° the balſam begins to boil, and much benzoic acid is ſublimed, while a little water, much oil and gas come over until the temperature reaches 617°. The gas is chiefly carbonic acid mixed with a portion of olefiant gas. On increaſing the heat a browniſh oil comes over, and at laſt a black oil of the conſiſtence of pitch, with a conſiderable quantity of gas, part of which is carbonic acid, but the greateſt part ſeems to be olefiant.—Sulphuric acid converts this balſam into charcoal, the proportion of which amounts to no leſs than 64 *per cent.* of the original weight of the balſam. The reſidue is artificial tannin. The nitric acid evolves the pruſſic acid, and converts the balſam into artificial tannin. Both acids occaſion, by digeſtion, a copious ſublimation of benzoic acid.

(2429.) *Styrax* is obtained by boiling the bark of the *liquidambar ſtyraciflua*, a tree which grows in Virginia and ſeveral parts of America. A ſimilar tree called *roſa mallos* by the natives grows in the iſland of Cobroſs in the Red Sea, where the bark is boiled in ſalt water to the conſiſtence of bird lime, and then put into caſks. It is of a greeniſh colour, an agreable ſmell, and aromatic taſte. It abſorbs oxygen from the air and becomes harder.

It is ſoluble in alcohol, and water extracts from it benzoic acid.

(2430.) The ſolid balſams are three in number, namely *Benzoin*, or *Benjamin*, which is extracted from inciſions made in the *ſtyrax benzoe*, a tree which grows in Sumatra. It is a ſolid brittle ſubſtance, of a yellowiſh white colour; has little taſte, but a very agreeable ſmell, which is increaſed by heat. It has been long uſed in medicine, and when treating of benzoic acid (993 &c.) we pointed out the methods by which the acid is extracted from the balſam. It is not affected by cold water, but boiling water takes up a portion of the acid. Warm alcohol diſſolves it, and it is readily ſoluble in ether. Sulphuric acid diſſolves it, while benzoic acid ſublimes. By continued digeſtion the balſam is converted into artificial tannin, and into charcoal, of which the quantity is 48 *per cent.* of the benzoin diſſolved. Nitric acid acts with violence on benzoin, and when aſſiſted by heat, converts part of it into artificial tannin. It is ſoluble in acetic acid, and in a boiling lay of the fixed alkalies.—Mr Brande expoſed 100 grains of benzoin in a retort, to a heat gradually raiſed to redneſs. The products were

Benzoic acid	9·0
Acidulous water . . .	5·5
Butyraceous and empyreumatic oil	60·0
Charcoal	22·0
Carbureted hydrogen and carbonic acid gaſes	3·5
	100·0

(2431.) *Storax* is obtained from the *ſtyrax officinalis*, a tree which grows in the Levant, and ſome parts of Italy. It is brought to us in cakes which are of a reddiſh brown colour, but ſoft to the touch. This is the moſt fragrant of all the balſams. It is ſoluble in alcohol; and when diſtilled by Newmann, nearly the ſame products were obtained as from benzoin.

(2432.) *Dragons blood* is ſaid to be furniſhed by the *calamus draco*, the *dracona draco*, and the *pterocarpus draco*, trees which grow in the Eaſt Indies. There are two kinds of it, one in ſmall oval drops, of a fine deep red, which become crimſon when pounded. The other is in larger maſſes, ſome of which are pale, and ſome dark red. Alcohol diſſolves the greateſt part of it, forming a fine deep red ſolution, which ſtains marble eſpecially if it be heated. It alſo diſſolves in oils, and conveys to them a deep red colour. It melts by heat, inflames, and emits benzoic acid. When digeſted with lime, a portion of it becomes ſoluble in water, and conveys to it a balſamic odour. Nitric acid detatches benzoic acid, and converts the reſidue into artificial tannin. Sulphuric acid alſo converts it into artificial tannin, and evolves charcoal, amounting to 48 *per cent.* of the dragon's blood employed.

XXVI. Caoutchouc.

(2433.) This ſubſtance being much employed in rubbing out pencil lines, and cleaning paper, is generally known in this country under the name of *Indian Rubber*. It exudes in the form of a milky juice from punctures made in the *hevea caoutchouc*, and the *jatropha elaſtica*, which grow in Brazil. It is alſo obtained from the *ficus indica*, the *artocarpus integrifolia*, and the *urceola elaſtica*, in the Eaſt Indies. It may probably be obtained from ſeveral other trees.—When the milky juice is expoſed to the air, it gradually lets fall a concrete ſubſtance, which is caoutchouc. If oxymuriatic acid be added to the juice, the depoſition takes place immediately, and the acid loſes its odour. If the milky juice be confined in a glaſs veſſel with air, a ſkin of caoutchouc forms on its ſurface. This renders it probable that the formation of caoutchouc is effected by combination with oxygen.

(2434.) Caoutchouc is of a white colour, without either taſte or ſmell. The natives form it into bottles and other figures, by ſpreading the milky juice upon moulds of clay, and drying it in the ſmoke. This occaſions the caoutchouc of commerce to be of a dark colour, as it is compoſed of alternate layers of caoutchouc and ſmoke. This ſubſtance is ſoft and pliable like leather. It is remarkably elaſtic, and can be drawn out to a great length, and recovers its former figure if the force is removed. Its adheſion is ſuch that it cannot be broken without a very conſiderable force. Mr Gough of Mancheſter obſerved that when ſtretched its temperature is raiſed, and if it be then plunged into cold water it loſes much of its contractile power and does not return to its former dimenſions unleſs to be plunged into warm water, or warmed in the hand. This is conſidered as a fine illuſtration of Dr Black's theory of latent heat, and a proof that the elaſticity of caoutchouc, and the ductility of metals, are occaſioned by the ſame cauſe, namely the latent heat they contain.

(2435.) Caoutchouc is inſoluble in water, but if boiled ſome time it ſoftens, and then if two pieces be applied to each other, and preſſed they adhere as if they were but one piece. In this way different pieces of caoutchouc may be ſoldered together, and made to aſſume any figure we pleaſe. This ſubſtance is inſoluble in alcohol; but it is ſoluble in ether that has previouſly been waſhed with water. Alcohol precipitates caoutchouc from its etherial ſolution. After the ether is evaporated, the caoutchouc remains unaltered; and this ſolution might be uſed like the original milky juice of the tree, for making varniſh, and utenſils of various kinds of caoutchouc, were not the ether too expenſive for ordinary purpoſes.—The great Frederick King of Pruſſia had a pair of boots made of caoutchouc. A mould of wrought clay, the exact figure of his leg, was covered with etherial ſolution of caoutchouc, laid on in alternate layers by a bruſh, until it acquired the proper thickneſs, after which the clay was knocked in pieces and taken out.—Caoutchouc is alſo ſoluble in the volatile oils; but after the oil is evaporated it never fully recovers its former elaſticity. Dr Thomſon aſcertained that alkaline ſolutions take up a minute portion of caoutchouc. The acids ſcarcely act upon it, and the ſulphuric only chars it externally.—Fabroni diſcovered that well rectified petroleum, or the volatile oil of coal, diſſolves caoutchouc, and after the oil is evaporated, leaves it unaltered. We conſider this to be a diſcovery of great importance, as it furniſhes a cheap ſolvent of caoutchouc for converting it into varniſh and various uſeful purpoſes, which has long been a deſideratum in the arts.—When heated it melts, but retains ever after the conſiſtence of tar. It burns with a bright white flame, and in the countries where it abounds it is uſed as candles. It exiſts in a great variety of plants, but can only be profitably extracted from thoſe in which it abounds. It is thought to be compoſed of carbon, hydrogen, azote, and oxygen, but the way in which theſe ingredients are combined is unknown.

XXVII. Gum Reſins.

(2436.) Theſe ſubſtances have long been uſed in medicine, but they have not attracted much of the notice of chemiſts. They ſeem to be compoſed of extractive, and an oil approaching in its properties to a reſin. They are uſually ſolid, opaque, and brittle. They are inflammable, but do not melt by heat like the reſins. Their ſmell is ſtrong, and their taſte often acrid. With water they form a milky ſolution; with alcohol a tranſparent ſolution, which becomes milky on adding water. Like reſins they diſſolve in heated alkaline ſolutions, and Mr Hatchett aſcertained that ſulphuric acid gradually converts them into charcoal and artificial tannin, as it does the reſin.—The principal of theſe ſubſtances which have been applied to uſe, are

(2437.) *Galbanum*, which is obtained from the *bubon galbanum*, a native plant of Africa. Its taſte is ſtrong, and ſmell peculiar. When diſtilled it yields about half its weight of volatile oil, which at firſt is of a blue colour.

(2438.) *Ammoniac* is brought from the Eaſt Indies, but its ſource is unknown in Europe. Its taſte reſembles that of Galbanum, but its ſmell is more pleaſant.

(2439.) *Olibanum*, is obtained from the *juniperus lycia*, a ſhrub which abounds chiefly in Arabia. It conſiſts of yellow, tranſparent, and brittle maſſes, whoſe taſte is bitter and nauſeous, but when burnt it diffuſes an agreable ſmell. This is the frankincenſe of the ancients, and by many ſects is ſtill employed as an appendage of public worſhip.

(2440.) *Aſafœtida* is obtained from the *ferula aſafœtida*, a native plant of Perſia. When the plant is about four years old, it is dug up, the roots cleaned, and their extremities being cut off, there exudes a milky juice. Another portion of the root is then cut off, and more juice exudes, and this proceſs is continued until the roots be exauſted. The juice hardens into brittle grains of different colours, whoſe taſte is acrid and bitter, with a ſtrong alliaceous and fetid ſmell. Diſtilled with water or alcohol, it yields a volatile oil which poſſeſs all the active properties of aſafœtida, and is much uſed in medicine.

(2441.) *Scammony* is obtained from the roots of the *convolvulus ſcammonia*, a climbing plant of Syria. This ſubſtance is employed in medicine as a powerful cathartic.

(2442.) *Gamboge* or *Gumgutt*, is obtained by wounding the ſhoots, or puncturing the bark, of the *ſtalagmitis cambogioides*, a tree which grows in various parts of India. It was firſt brought to Europe by the Dutch. Taken internally it operates as a violent cathartic. It is partially ſoluble in water, and almoſt entirely in alcohol. It is of a fine yellow colour, and is uſed as a paint, for colouring varniſhes, and for ſtaining marble.

(2443.) *Myrrh*, as we are informed by Mr Bruce is obtained from a genus of the *mimoſa*, a plant which grows in Arabia and Abyſſinia. It forms yellow tears, ſomewhat tranſparent when pure. Its taſte is bitter and aromatic, its ſmell peculiar. It was much admired by the ancients, and is ſtill much employed in medicine.

(2444.) *Euphorbium*, is obtained from the *euphorbia officinalis*, from which it exudes in the form of milky juice, and is afterwards dried in the ſun.—It is reckoned poiſonous.

XXVIII. Cotton.

(2445.) This product makes a conſpicuous figure in the clothing of many civilized nations, and in this country there cannot be fewer than from 7 to 8 hundered thouſand perſons employed in its manufacture. It envelopes the ſeeds of various plants, and the cotton of commerce is chiefly procured from different ſpecies of *goſſypium*. Various plants, which yield cotton, grow wild within the tropics, and ſeveral ſpecies of them are cultivated in the Eaſt and Weſt Indies. According to Mr Bryan Edwards, thoſe plants in the Weſt Indies which yield the fineſt cotton, or what are called *green ſeed cotton*, from the colour of their ſeeds. Of theſe there are two varieties, diſtinguiſhed by the eaſe and difficulty with which the cotton parts from the ſeeds. The cotton is enveloped in pods, which open when the ſeeds are ripe, and the cotton is ſeparated from the ſeeds by means of rollers.—Cotton ſeems to be chiefly compoſed of carbon; but as it has never been ſubjected to any preciſe chemical inveſtigation, we ſhall not pretend to decide reſpecting its component ingredients. For the methods of bleaching and dyeing cotton. See Bleaching and Dyeing.

XXIX. Suber.

(2446.) This conſiſts of the outer bark of the *quercus ſuber*, or common cork. It is a light, ſpongy, and elaſtic ſubſtance, and the trees which yield it grow in great abundance in Spain, and various countries not remote from the tropics. It does not expand nor become ſufficiently elaſtic for making corks, until after it has been partially burnt. It burns with a white bright flame, and leaves a light and bulky charcoal.—By digeſtion, water and alcohol extract a yellowiſh ſolution from it; ſulphuric acid chars it; and nitric acid converts it partly into ſuberic acid, partly into artificial tannin, partly into a ſubſtance reſembling wax, and partly into a ſubſtance reſembling ſtarch.—Fourcroy thinks the epidermis of all trees is a ſubſtance reſembling cork.

XXX. Wood.

(2447.) All plants contain more or leſs of what is called *woody fibre*. If plants be digeſted firſt in water and then in alcohol, until theſe ſolvents have taken up all the matters with which they can combine, there remains nothing but woody fibre. This conſiſts of longitudinal fibres, eaſily ſeparable into ſmaller fibres, and every plant exhibits croſs ſections peculiar to itſelf, and a particular arrangement of fibres which would lead one to think that the woody fibres are bundles of regularly formed cryſtals. From this peculiar arrangement of the fibres, different ſpecies of wood can eaſily be diſtinguiſhed, even after they are petrified, and form parts of ſolid rocks.—Woody fibre is not altered by water, alcohol or expoſure to the air. Weak alkaline ſolutions diſſolve, and it may be precipitated from them by an acid without alteration. This property renders woody fibre capable of being extracted from other vegetable products, few of which are ſoluble in weak alkaline leys.—Some of the acids char woody fibre, and it is converted into charcoal when heated to redneſs, without acceſs of air. When charred by acids, it moulders down into a black powder. When charred by heat its fibres retain their original ſtructure. Woody fibre conſtituting the bones of plants, it is generally underſtood that thoſe trees which, after being charred, yield the greateſt weight of charcoal compared with the original weight of the wood, form the moſt durable and leaſt deſtructive timber. But an experiment of Prouſt ſeems to contradict this generally received opinion; though in making ſuch experiments it is hardly poſſible to be accurate.—He took 1·00 of different trees, and found the weight of charcoal they yielded to be as follows:

Black aſh	0·25
Guaiacum	0·24
Pine	0·20
Green oak	0·20
Heart of oak	0·19
Wild aſh	0·17
White aſh	0·17

XXXI. Alkalies.

(2448.) The only alkalies found in plants are potaſh and ſoda. When ammonia occurs there is reaſon to think it is formed by putrefaction, or during the diſtillation of the plant. Potaſh is found in the aſhes of inland plants, and ſoda in the aſhes of thoſe which grow in the ſea, or on the ſhore. In ſome of the ſteppes of Ruſſia, where mineral ſalt abounds, there are ſalt lakes, and extenſive tracts impregnated with ſalt, where no other plants grow except thoſe which are peculiar to the ſea, and which yield ſoda.—It ſeems extremely doubtful whether potaſh previouſly exiſted in the plant, or if it be a product of combuſtion. Mr Davy has decompoſed potaſh and ſoda, and found their baſes to be metals ſomewhat reſembling mercury in their properties, but of much leſs ſpecific gravity than any other metals. In fact theſe alkalies are aſcertained to be metallic oxides, with exceſs of oxygen.

(2449.) Mr Davy of the Royal Inſtitution, having placed pure potaſh and ſoda on a diſh of platinum, and having gently moiſtened their ſurface ſo as to render them conductors, expoſed them to currents from powerful galvanic batteries. They both emitted oxygen gas, and were converted into metals reſembling mercury. The ſoda proved much more refractory than the potaſh. Mr Davy has diſtinguiſhed theſe metals by the names of *potaſium*, and *ſodium*. Both of them burn when in contact with air, or with water, or any ſubſtance which contains oxygen, and revert to their alkaline ſtate. Mr Davy contrived to keep them pure by immerſion in lately diſtilled naphtha, which is among the lighteſt of fluids. The reſult of a great variety of experiments, by Mr Davy, on theſe metallic baſes of the alkalies, is that ſix parts of metal and one of oxygen enter into the compoſition of potaſh, and about *ſeven* parts of metal and *two* of oxygen enter into the compoſition of ſoda.

(2450.) The metal which Mr Davy has choſen to diſtinguiſh by the name of *Potaſium*, becauſe it forms the baſis of potaſh, appears ſo like mercury that the eye cannot diſtinguiſh betwixt them when they are placed together. But at 60° its fluidity is much leſs than that of mercury. At 100° its fluidity is perfect; at 50° it becomes malleable; and at 32° it cryſtallizes. At 40° it ſwims in naphtha, among the lighteſt of fluids; its ſpecific gravity is to that of water as ſix to ten. Its ſpecific gravity is the moſt ſingular of its properties; for though the lighteſt of all fluid bodies, it requires a red heat to diſtil it, and it is not altered by the proceſs. It is an excellent conductor of electricity. When fuſed with dry potaſh, it firſt forms a grey ſubſtance, and when the fuſion is complete it becomes red brown. This is owing to its robbing the alkali of part of its oxygen; and when the mixture is expoſed to the air, the whole ſoon reverts to the ſtate of alkali. It burns ſpontaneouſly in oxymuriatic gas, with bright flame, and forms muriate of potaſh. Heated in hydrogen gas, it diſſolves, and the compound gas explodes and depoſits the metal on cooling. Thrown into water it deflagrates; and a white ring of ſmoke frequently follows the flame, as when phoſphurets are thrown into water. Put into water, into a cloſe veſſel, no light enſues; but water is decompoſed, and pure hydrogen gas is evolved. A globule, placed upon ice, burns with a bright flame, leaving a hole filled with ſolution of potaſh. It diſcovers and decompoſes the ſmalleſt portions of water in ether. It decompoſes the ſulphuric and nitric acids, forming with the parts of theſe acids which remain undecompoſed ſulphates and nitrates of potaſh. It combines with ſulphur and phoſphorus, and the compounds, on expoſure to the air, are converted into ſulphates and phoſphates. With mercury it amalgamates, and the amalgam being expoſed to the air, is decompoſed into potaſh and pure mercury. It alſo unites with other metals, but the potaſium is converted into potaſh when the compound is expoſed to water. It decompoſes the water, or abſorbs the oxygen, in rancid oils, and forms a brown ſoap. It forms an imperfect oxide with the alkalies in the compoſition of glaſs, which by expoſure to the air are converted into perfect alkali, and the glaſs is decompoſed.

(2451.) *Sodium* only differs from *potaſium* in a few particulars. The appearance of the former is every way ſimilar to that of the latter; but the ſpecific gravity of ſodium is greater, and it is conſiderably leſs fuſible. Sodium melts at 120° and is perfectly fluid at 180°. Its ſpecific gravity to that of water is nearly as *nine* to *ten*. It decompoſes air, water, and acids, but without light. The only known exception is the nitric acid, in decompoſing which it emits light. In other reſpects it reſembles potaſium.

(2452.) What is here ſtated ought to have been introduced when we were treating of the metals; but when engaged on that part of our ſubject though we had heard indiſtinct rumours, we had no certain knowledge of the important and intereſting diſcoveries of Mr Davy.—We have ſince heard that he has ſucceeded in decompoſing the alkaline earths, and has found their baſes to be highly inflammable metals.—That he has decompoſed the baſis of ammonia, which is azote, and found the metal thus produced combines with mercury, which it converts into a ſolid, while it very much diminiſhes its ſpecific gravity. It would hence appear that azote, which forms ſo large a part of the atmoſphere, is in fact a metallic oxide. It is probable that all the earths, of which ſtones are compoſed, will ſoon be diſcovered to be metallic oxides; and then we ſhall no longer be ſurpriſed at the formation of meteoric ſtones, and even of iron, nickel, and ſulphur which make part of theſe ſtones in the atmoſphere.

(2453.) We underſtand that Mr Davy has lately ſucceeded in decompoſing the muriatic and fluoric acids, and found them to contain a metallic baſe, united to oxygen.—Such diſcoveries form an era in the hiſtory of ſcience, approaching in ſplendor to the era of Sir Iſaac Newton.—We underſtand that Mr Davy is alſo intent upon the decompoſition of charcoal, of ſulphur, and other bodies, if he has not actually proved them to be metallic oxides.—What effects may reſult from the diſcoveries Mr Davy has already made, or what farther diſcoveries he may ſtill make, aided as he is by ſuch new and powerful inſtruments of analyſis, it is impoſſible to foreſee. Whatever practical conſequences may iſſue from his diſcoveries, a conjecture we ventured to hazard when treating of elementary bodies, before we had heard of Mr Davy's diſcoveries, ſeems likely to be realized.—"That the only elementary bodies, of which the material univerſe is compoſed, would be ultimately found to be one, or at moſt two." The effect of Mr Davy's diſcoveries will be to produce a conviction that all bodies conſiſt of a metallic, or oxydizable, or if more agreeable, an inflammable baſis, and oxygen which is diſpoſed to combine with that baſis.—Perhaps it may afterwards be found that oxygen itſelf is a metallic oxide; and that the only circumſtance which occaſions apparent differences in various kinds of matter, is that ſome of them are arranged in groupes, where the particles, being within the ſphere of each other's attraction, form denſe and ſolid bodies. Thoſe particles that are removed to a certain extent beyond each others attraction form fluids; while thoſe which are removed entirely beyond the reach of each others attraction, form elaſtic vapours, and are only acted upon by gravitation, which draws all bodies towards the center of the earth.

(2454.) But after this digreſſion, it is time to revert to the ſubject of which we were treating, which was the formation of alkalies in plants.—It is poſſible that only the metal exiſts in combination with the plant, and that it combines with oxygen, ſo as to form an alkali, during the proceſs of combuſtion. We have not heard that any perſon has ſucceeded in extracting theſe alkalies from plants unleſs they were previouſly reduced to aſhes, which ſeems to ſtrengthen the opinion that the alkalies are products of combuſtion.—When treating of ſoda we ſuppoſed it to be formed from the decompoſition of ſea-ſalt during the combuſtion o the plant, becauſe we found ſea-ſalt in freſh marine plants, but no trace of ſoda until after the plants were burnt with acceſs of air. But it i poſſible that the metallic baſis of ſoda may b formed by combination with oxygen during combuſtion.

(2455.) It generally happens, though not alway that the plants which yield moſt aſhes, yield a the greateſt proportion of potaſh. Shrubs yield about three times as much aſhes, and herbs abou five times as much as trees. The leaves of tree produce more aſhes than the branches, and th branches more than the trunk, from equal weight of the material. Herbs arrived at maturity produce more aſhes than formerly, and green herb more than thoſe which are dry. Sulphate of potaſh, muriate of potaſh, ſulphate of lime, phoſphate of lime, and other ſalts, though in ver ſmall proportions, are found in the aſhes of plant as well as potaſh. The ſoda yielded by marin plants bears a much greater proportion to thei weight, than the potaſh yielded by land plant bears to their weight.

XXXII. Earths.

(2456.) Whether the earths found in plants b a product of vegetation, or if they be actually abſorbed by their roots from the ſoil, is a problen which chemiſtry has not yet been able to ſolve The great objection againſt abſorption by th roots, is the want of any known ſolvent for ſom of the earths, and we cannot conceive them capable of entering the minute veſſels of plants in a ſo lid ſtate.—The earths which have hitherto bee found in plants are *lime*, *ſilica*, *magneſia*, *alumin*

(2457.) Lime is the moſt general, and the mo abundant earth in plants. The only plant whic is known not to contain any of it is the *ſalſola ſo da*. Silica is found in many plants, particularl in graſſes and equiſetums. Mr Davy found tha it makes a part of the epidermis of theſe plant and that in ſome the epidermis is almoſt wholl compoſed of ſilica. 100 parts of the epid. of bon

net cane yielded 90 parts ſilica
bamboo 71·4
common reed 48·1
ſtalks of corn 6·5

The quantity of earth is greater in herbs than i trees. Bergman found all the four mentione earths in every kind of grain he analyſed. Vauquelin having reduced 100 parts of oat grain to aſhe found the reſiduum to be 3·1591, which wa compoſed of

Silica	60·7
phoſphate of lime	39·3
	100·0

But when the oats were burnt along with the ſtraw the reſiduum was compoſed of

Silica	55
Phoſphate of lime	15
Potaſh	20
Carbonate of lime	5
	95 and a little oxide of iro

Thi

This ſhews that ſubſtances exiſt in the ſtraw which do not enter into the compoſition of the grain.

(2458.) The following Table exhibits the quantity of earths and metallic oxides which Schrœder obtained from 32 ounces of different kinds of corn, and from the ſame weight of rye ſtraw.

	Wheat.	Rye.	Barley.	Oats.	Rye Straw.
Silica	13·2	15·6	66·7	144·2	152
Carbon. of lime	12·6	13·4	24·8	33·75	46·2
Carbonate of magneſia	13·4	14·2	25·3	33·9	28·2
Alumina	0·6	1·4	4·2	4·5	3·2
Oxide of manganeſe	5·0	3·2	6·7	6·95	6·8
Oxide of iron	2·5	0·9	3·8	4·5	2·4
	47·3	48·7	131·5	227·8	238·8

XXXIII. METALS.

(2459.) The only metals found in vegetables are ron, which is by far the moſt common, manganeſe, and, if we may rely on the accuracy of ſome chemiſts, gold. Theſe metals occur in ſuch minute proportions that it requires very delicate teſts o detect their preſence. The aſhes of the ſalſola oda contain a conſiderable portion of iron, and 6 ounces of unbleached cotton, according to Mr Grimſhaw, contain about four grains of ir cheele firſt diſcovered mangaueſe in vegetables. Prouſt found it in the aſhes of the pine, calendula, ine, green oak, and fig tree.—The ſame queſtion occurs reſpecting theſe metals that was ſtated reſpecting the earths.—Whether they be products of egetation? or if they enter the plants in ſolution.

DIVISION XII.

ANIMALS.

(2460.) The vegetable approaches the animal ingdom by ſuch inſenſible gradations that it is npoſſible to decide where the firſt terminates and ne ſecond commences. We can be at no loſs to etermine to which claſs thoſe which are at a diſtance from the boundaries ought to be referred. 'he more perfect animals are endowed with locomotion, ſenſation, and intelligence, which is not ne caſe with vegetables. But there is a numerous t of organized bodies on the confines of each ingdom which we are at a loſs whether to refer o the claſs of vegetables or of animals.—Animals eſemble vegetables in the complexity of their ructure and in the many nice and delicate operaons which are performed by their ſeveral organs. 'o inveſtigate theſe is the object of Phyſiology nd Anatomy. We ſhall confine ourſelves to thoſe opics which are connected with chemiſtry.

SECT. I. FUNCTIONS OF ANIMALS.

I. DIGESTION.

(2461.) It is well known that animals cannot ng exiſt without food. The food of animals ems to be ultimately derived from vegetables; though ſome animals feed entirely upon vegetable, and ſome on animal food, and ſome, ſuch as man, on a mixture of both. Many fowls and quadrupeds which prefer vegetable, may be gradually trained to feed upon animal food; and others, ſuch as the eagle may be trained to exchange animal for vegetable food. The ſtomach is the great reſervoir of the food of animals, and it ſerves the ſame purpoſe to them that roots do to plants.

(2462.) The mouth is the aperture by which food is introduced into the ſtomachs of animals, and many of them are furniſhed with teeth by which their food is ground down, and reduced to a pulpy maſs; while at the ſame time it is mixed with ſaliva which is ſecreted from glands in the mouth, which lubricates and facilitates its paſſage down the eſophagus, while it prepares it for digeſtion in the ſtomach. Some animals, ſuch as ſerpents, firſt lubricate their prey with a juice reſembling ſaliva, and then ſwallow it. Others, ſuch as fowls, ſwallow their food entire, but pick up ſmall ſtones or grains of ſand, which, in their firſt ſtomach, ſerve the purpoſe of teeth in grinding their food by its great muſcular power. Though moſt fiſhes be furniſhed with teeth, they do not ſeem to employ them for the purpoſe of grinding their food, but with a view to ſeize and ſubdue the animals on which they prey. Some animals, ſuch as the whale, ſwallow down their food alive, and ſome have the teeth with which it is ground lodged in their ſtomachs. The ſtomach varies in figure and ſize in different animals. In man it reſembles the bag of a *bag-pipe*. After the food reaches the ſtomach, it is changed into a pulpy maſs, and acquires properties very different from thoſe of the original food. After the food has undergone this change in the ſtomach, it is called *chyme*; and it now poſſeſſes properties very different from thoſe which it exhibited in its original ſtate.

(2463.) To account for this change produced on food by the action of the ſtomach, ſeveral theories have been had recourſe to. The firſt opinion was that the ſtomach reduced the food put into it, into a ſtate of ſoft pap, in conſequence of mechanical compreſſion and friction, owing to its muſcular power. But no degree of compreſſion was found to convert food into chyme, when applied out of the ſtomach.—Hence this idea was ſoon abandoned, and *fermentation* was had recourſe to. Air and acid are ſometimes generated in the ſtomach, and the converſion of food into chyme was ſuppoſed to be a proceſs ſomewhat analogous to the vinous, the acid, or the putrid fermentations. But it was obſerved that when any thing analogous to fermentation took place in the contents of the ſtomach, their converſion into chyme ſo far from being accelerated, was retarded. It was alſo obſerved that putrid food, of every kind, reſiſts digeſtion, and is not convertible into chyme.

(2464.) The experiments of Stevens, Reaumur, Spallanzani, Scopoli, and many others, have eſtabliſhed the fact, That chyme is not produced by any of the cauſes mentioned, but by a juice ſecreted from the ſtomach, which, for this reaſon, is called the *gaſtric juice*. This juice had been found capable of diſſolving all animal and vegetable ſubſtances, provided they be not putrid, and provided the exterior ſkins or huſks of ſeeds be broken, or bruiſed. Horſes which ſwallow grain, ſuch as oats, without bruiſing or breaking the ſkins with their teeth, always paſs the ſame grain unchanged, without its contributing to their nouriſhment. Hence the propriety of bruiſing all ſeeds given to animals, by a machine, before they are adminiſtred. If pieces of food be incloſed in cloſe tubes, they paſs through the body without any other change than would have taken place by ſubjecting the food to the ſame temperature out of the body. But if the ſame food be incloſed in tubes perforated with ſmall holes, it is converted into chyme; a clear proof that this converſion is owing to a liquid ſecreted from the ſtomach. Some medical Gentlemen at Edinburgh tried experiments upon a man who exhibited himſelf as a ſhowman in this country by ſwallowing ſtones. They made him ſwallow metallic balls, perforated with ſmall holes, and ſtuffed with dry ſponge. After the balls had paſſed through him, they ſqueezed a juice from the ſponge which diſſolved such animal and vegetable food as is commonly uſed for the ſuſtenance of man. Various other methods have been tried to obtain the gastric juice, ſuch as making animals vomit when their ſtomachs are empty, or by cutting them up, and leaving it with a ſpoon from their ſtomachs. It does not appear however, that any methods yet adopted, are ſufficient to obtain this juice in a ſtate of purity. One prominent quality of this juice is that it never attacks the animal body while in a living ſtate; but no ſooner does death enſue, than it immediately diſſolves the ſtamoch from which it is ſecreted. Human bodies being always laid upon their backs, there is always found a conſiderable eroſion, or a hole in the lower part of the ſtomach, next the ſpinal vertebræ, and often a conſiderable proportion of the parts on which the gaſtric juice has acted, converted into chyme, provided the body has lain ſome time in this poſition. This led the older anatomiſts to ſuppoſe that the human ſpecies died in conſequence of an eroſion, or rupture in the ſtomach the cauſe of which they ſeem not to have underſtood.—What the nature of this juice may be is yet undecided. The great difficulty, which has never been ſurmounted is to obtain it in a pure ſtate. It is always combined with a portion of the food on which the animal feeds, and by this combination its original properties are loſt, or altered, Some think it an acid, and ſome an alkaline ſubſtance; but Count Spallanzani has ſhewn that when theſe ſubſtances appear in the contents of the ſtomach, they are generated in the food, and have no connection with the gaſtric juice.—He has demonſtrated that this juice has neither acid nor alkaline properties. In the ſtomach of the dog, as well as all thoſe which are capable of feeding on animal food, he has ſhewn that bones are readily converted into chyme by the gaſtric juice.—Hence when a man has got a bone ſticking in his gullet, if it cannot be extracted, he has only to get it down to his ſtomach, where it will diſſolve and become part of his food.—It is probable that the properties of gaſtric juice vary in different animals. Macquer and Vauquelin have aſcertained that the juice found in the ſtomachs of ſheep, oxen, and calves, always contains a portion of phoſphoric acid. Seven grains of the inner coat of a calf's ſtomach, being ſteeped in water, yields a juice which coagulates 100 ounces of milk, or 6857 times their own weight, and yet the weight of the ſtomach is not ſenſibly diminiſhed, and it is ſtill capable of yielding more coagulating juice.

(2465.) After the food is converted into chyme in the ſtomach, by the action of the gaſtric juice, it paſſes through the lower orifice of the ſtomach into the lower inteſtines. At the ſame time it is lubricated by the gall juice, which occaſions it to ſeparate into two parts, *feces* and *chyle*. The feces or excrement are thrown out of the body. The *chyle* is a white liquid every way reſembling milk, though its properties have not been chemically examined. During the progreſs of the materials through the lower inteſtines, the chyle is abſorbed by a great number of ſmall veſſels called *lacteals*. There have been perſons who emitted no excrement, by the regular paſſage, for years; but their excrements were abſorbed by the lacteals, and diſcharged through the ſkin, which occaſioned ſuch perſons to emit the peculiar ſmell of excrement. This ſhews that after the chyle and feces are once ſeparated by the action of the gall juice, they never after form a combination, though they ſhould paſs together through the circulating veſſels of the body.

(2466.) The lacteals convey the chyle into a large tubular veſſel called the *thoracic duct*, where it is mixed with a tranſparent fluid called *lymph*, which is conveyed from all the cavities of the body by another ſet of veſſels called *lymphatics*. All theſe veſſels are furniſhed with numerous valves, ſo that the chyle and lymph are forced forward by their contraction, but the valves prevent them from returning. Very little is known concerning the properties either of chyle or of lymph. After they are mixed in the thoracic duct they paſs immediately into the blood veſſels. In man and many other animals, the thoracic duct pours its contents into the blood, at the junction of the left ſubclavian and carotid veins. There, being mixed with the blood, they paſs immediately to the heart, from which they are projected into the lungs to undergo new changes.—The above is a ſummary of what is yet known reſpecting digeſtion. It is evident that ſeveral chemical proceſſes are combined in effecting it; though the nature of theſe is unknown.

II. Respiration.

(2467.) Reſpiration conſiſts in drawing into the lungs and ejecting alternately, a certain quantity of air. Every one knows that man and the hot blooded animals ſoon die if this proceſs be ſuſpended. No other gaſeuos bodies are capable of long ſupporting reſpiration except *common atmoſpheric air*. The *carbonic acid*, the *ammoniacal gas*, and ſome others cannot be drawn into the lungs at all, as the epiglottis excludes them, by cloſing ſpaſmodically upon them. Theſe gaſes occaſion almoſt immediate death, apparently by ſpaſmodic covulſions in the nervous ſyſtem, and excluding from the lungs the acceſs of atmoſpheric air. The *hydrogen* and *azotic gases* may be drawn into the lungs, but produce almoſt inſtant death, apparently by excluding

ing atmoſpheric air. But theſe gaſes occaſion no perceptible change in the blood. The *carburetted hydrogen*, *ſulphuretted hydrogen*, *carbonic oxide*, and ſome other gaſes, not only ſuffocate by filling the lungs, and excluding the acceſs of air, but they alſo kill by producing certain changes in the blood. The *oxygen* and *nitrous oxide gaſes* may be breathed ſome time without much inconveniency. But if breathing them be long perſiſted in, they deſtroy the animal at laſt. The only gas which can be ſafely breathed for any length of time is *atmoſpheric air*.

(2468.) If a man perſiſts in breathing atmoſpheric air, and ejecting it rapidly, it will deſtroy him as effectually as the moſt noxious gas. This led to a ſuppoſition that the air in the lungs undergoes ſome change which there is not time to effect by rapid voluntary breathing, too long perſiſted in. In 1757 Dr Black firſt ſhewed that by drawing air into his lungs, and then blowing it through a glaſs tube, or ſtraw, among lime-water, carbonic acid was produced; though no milkineſs appeared in the lime-water when the air breathed was blown through lime-water, without previouſly entering the lungs. Prieſtley and Scheele demonſtrated that the quantity of oxygen in the air is diminiſhed in conſequence of reſpiration. Lavoiſier and many other philoſophers aſcertained that no animal can live in air which is wholly deprived of oxygen. Even fiſh ſoon die in water which has been previouſly deprived of oxygen, by boiling, or other means. Frogs and other amphibious animals, which riſe to the ſurface in order to breathe atmoſpheric air, and which can ſuſpend reſpiration a conſiderable time, die in about 40 minutes if the water in which they live be covered with oil. They likewiſe ſoon die if put in a cloſe veſſel containing water, where only a limited quantity of air is admitted. Vauquelin has proved that worms and inſects require and conſume air as well as other animals, and that without acceſs to it, they ſoon die.—Perhaps the only exception to this rule are certain inſects, which live in putrid waters, apparently of the polypus claſs. Theſe, like plants, abſorb noxious gaſes, and give out oxygen. But it ſeems extremely uncertain whether theſe organized beings ſhould be ranked in the animal or vegetable kingdom.—The effect of animals acting on air, is to diminiſh the quantity of oxygen in the air reſpired.

(2469.) The quantity of air, inhaled, and of oxygen conſumed is very various in different animals. Man, and the hot blooded animals, conſume moſt oxygen, and inhale a greater proportion of air than the cold blooded animals. Dr Hales, Dr Menzies, Mr Davy, and Dr Thomſon, endeavoured to aſcertain how often a man breathed in a minute. Their average is 19 times in a minute, or 27,800 times in 24 hours. But let theſe Gentlemen climb a lofty and ſteep mountain, or engage in any ſevere bodily fatigue they will ſoon find that the number of inhalations neceſſary to ſupport life is always proportioned to the rapidity with which the blood is brought round to the lungs; and that calm experiments in a room, on this ſubject, decide nothing. Dr Barclay aſcertained that the amphibious animals, acquire a habit of ſuſpending reſpiration. But this habit is not confined to the amphibious animals, for it is well known that the people who dive for pearls off the coaſt of Ceylon, if they ſhould fail in filling their baſket with pearl oyſters, which ſeldom occupies them more than from 10 minutes to a quarter of an hour, often remain below water from half an hour to three quarters, or longer, without any poſſibility of reſpiring. In ſuch caſes the animal frame ſeems to approach the torpid ſtate where the very languid circulation of the blood requires very little air to act upon it. In all caſes the rapidity of breathing ſeems to depend on the rapidity with which the blood after being projected through the ſyſtem is again projected through the lungs. The quantity of air drawn in and thrown out at every reſpiration muſt depend upon a man's ſize, and the capacity of his lungs. It is calculated that on an average there may be 180 cubic inches of air in the lungs, and that 40 inches or $\frac{1}{4}$th of the whole may be drawn in and thrown out at every reſpiration. Suppoſe 20 reſpirations made in a minute this will amount to 800 inches in a minute; to 48,000 inches in the hour; and to 1,152,000 inches in 24 hours; the weight of which air exceeds 52 $\frac{1}{4}$ lbs avoirdupois.

(2470.) When air is drawn into the lungs it undergoes a change. Part of its oxygen diſappears and carbonic acid gas is ſubſtituted in its place. It alſo becomes loaded with watery vapour. The air is alſo diminiſhed in bulk, and Mr Davy found the diminution to vary from $\frac{1}{70}$th to $\frac{1}{100}$ of the original bulk. But the effect produced upon air varies ſo much with the ſame animal at different times, that it does not ſeem poſſible to reduce it to calculation. From the reſult of Dr Menzies' experiments it would ſeem that a man conſumes 36 inches of oxygen in a minute, or 51,840 inches in 24 hours. Lavoiſier eſtimated that a man conſumes only 46,037 cubic inches of oxygen in 24 hours; with which Davy nearly correſponds, who eſtimates that 45,504 inches are conſumed by a man in 24 hours. It hence follows that as the oxygen amounts only to $\frac{1}{5}$th of the atmoſphere, a man in the courſe of a day, renders unfit for reſpiration no leſs then 125 cubic feet of air. The oxygen while in the lungs combines with carbon, forming carbonic acid gas, and many experiments have been made, with doubtful reſult, to aſcertain whether the bulk of the carbonic acid formed be equal, or leſs than, the bulk of the oxygen conſumed. It appears moſt probable that the bulk of carbonic acid formed is leſs than that of the oxygen conſumed. Dr Thomſon thinks that, at an average, there may be about 40,000 cubic inches of carbonic acid gas formed by the reſpiration of a man in 24 hours and this quantity of carbonic acid contains nearly three quarters of a pound avoidupois of carbon. Dr Prieſtley found that a portion of azote diſappeared when air was drawn into the lungs and Mr Davy aſcertained that the azote loſt amounted to $\frac{1}{7}$th of the oxygen. But Dr Thomſon found theſe reſults to be variable and uncertain. When air is emitted from the lungs, a quantity of water, in vapour, is alſo found mixed with it, which it did not contain when inhaled. Dr Hales eſtimated the quantity of water emitted by a man in 24 hours, at 20·4 oz. Lavoiſier eſtimates it rather higher; but it is very difficult to attain accuracy in ſuch experiments.

(2471.) Theſe are the changes which the air undergoes in conſequence of reſpiration. But the blood, the whole of which is projected through the lungs, after every revolution through the body alſo undergoes a remarkable change. Neither chyle nor lymph can be diſtinguiſhed in it, but the whole acquires a florid ſcarlet colour. The blood which returns to the heart by the veins, is of a dark reddiſh purple colour; but the arterial blood in conſequence of paſſing through the lungs, is of the colour above deſcribed. Dr Prieſtley aſcertained that venous blood acquires the florid colour of arterial blood, when it comes in contact with oxygen gas: and that hydrogen gas changes the colour of arterial blood into that of venous blood, and that the ſame effect is produced when arterial blood is placed *in vacuo*. From theſe facts Dr Prieſtley inferred that blood in its paſſage through the lungs, gives out phlogiſton and that the purpoſe of reſpiration was to free the blood of this ingredient. According to Lavoiſier, the blood while flowing through the lungs gives out hydrogen and carbon which combining with the oxygen of the air inſpired from water and carbonic acid. De La Grange thought that the oxygen entered into combination with the blood, and at the ſame inſtant a portion of carbonic acid and water were ſeparated from it. Dr Crauford thought the combination of carbon with oxygen took place in the lungs, and not in the blood. It is probable the watery vapours, may be ſecreted from appropriate veſſels to mix with the air in the lungs.

(2472.) One great effect of reſpiration is the formation of fibrin in the blood. As this goes to ſupport the muſcular fibres, the moſt active parts of the body, and therefore moſt expoſed to waſte, it is neceſſary that the body ſhould be furniſhed with a conſtant ſupply. Fibrin does not exiſt either in the lymph or in the chyle, the ingredients from which blood is formed. Fourcroy aſcertained that it contains more azote and leſs carbon than any of the other ingredients of the blood or of the chyle. We muſt therefore aſcribe this diminution of carbon to the carbon which is carried off from the blood in the lungs, in union with oxygen, in the form of carbonic acid gas. Though the effect is certain the manner in which it is produced is unknown.

(2473.) Another effect of reſpiration is raiſing and keeping up the temperature of animals. The heat of animals is always in proportion to the quantity of air they breathe, compared with their ſize. Fiſhes and many inſects which do not breathe, have a temperature very little ſuperior to the medium in which they live. Man and many quadrupeds have a temperature from 96° to 98°. Birds which breathe a greater quantity of air in proportion than men, have a temperature equal to 103° or 104°.

(2474.) Dr Black explained the temperature of animals by his ingenious theory concerning latent heat. According to him part of the latent heat of the air which is drawn into the lungs becomes ſenſible, and raiſing the temperature of the blood in the lungs, is by it conveyed over the whole body. But to this a very ſtrong objection was urged. That if this account were well founded, the heat of an animal ought to be greateſt in the lungs, and ought gradually to diminiſh towards the extremities; which is not true in fact. Dr Crauford, who explained animal heat upon Dr Black's principles, obviated this objection by diſcovering that the ſpecific caloric of arterial blood was 1·0300, while that of venous blood was only 0·8928. Hence it requires an additional quantity of caloric to keep the temperature of arterial blood as high as when it had been venous blood. During the progreſs of circulation the arterial is gradually changed into venous blood, and gives out this additional quantity of caloric. From this it follows that the temperature of the blood in the lungs cannot be greater than that of the extreme parts of the body. This ſolution is eſteemed ſatisfactory, and is now univerſally received.

III. SECRETION.

(2475.) Secretion is performed by peculiar organs, and its object is to extract from the blood products adapted for particular purpoſes, or which may increaſe the growth or repair the waſte of particular parts. Other ſecretions will be treated of under *animal products*; but at preſent we ſhall only conſider the ſecretion of urine, and perſpiration by the ſkin, as theſe ſeem to change the compoſition of the blood, and to render it fit for the purpoſes it is intended to ſerve.

(2476.) The *Kidneys* are the organs by which the urinary ſecretion is performed, and it is generally ſuppoſed that the whole maſs of the blood paſſes through the kidneys in regular ſucceſſion. The matters ſecreted by the kidneys are entirely thrown out of the ſyſtem, and the functions of this organ muſt be of high importance, for if they be impeded or ſuſpended by diſeaſe or otherwiſe, the animal ſoon dies. It is thought that the kidneys produce a change in the chemical compoſition of the blood, or of ſome important part of it. A chemical proceſs, it is certain, goes on in the kidneys themſelves, for urine contains two products, namely *urea* and *uric acid* which did not previouſly exiſt in the blood. But how the kidneys effect theſe chemical changes is ſtill involved in obſcurity.

(2477.) *Perſpiration* is an exudation from all parts of the ſkin. Whether this be a caſe of ſimple evaporation, or if there be organs diſtributed over the ſkin by which it is effected, is not aſcertained. The general opinion is that the mouths of ſmall blood-veſſels, which terminate on the ſkin, have a power of ſecreting and diſcharging matters which would prove injurious to the blood, and to the health of the animal. This ſecretion ſeems to be of equal importance with the foregoing, for no animal can live long if this function be ſuppreſſed. It is divided into *inſenſible* and *ſenſible* perſpiration.

(2478.) To aſcertain the quantity of matter perſpired through the ſkin, many experiments have been made. The firſt who attempted theſe was Sanctorius, who conducted them during 30 years. Having conſtructed a chair upon an accurate ſteelyard, he regularly weighed himſelf and his food. He alſo weighed his excrements, and whatever he loſt over and above theſe, he aſcribed to perſpiration. Many experiments were made by ſeveral other perſons to aſcertain this point; but as none of them took into account what was loſt from the lungs, by reſpiration, they ſeem to be inconcluſive. With a view to correct their errors, Lavoiſier encloſed Sequin in a bag of varniſhed ſilk, which had an aperture through which he could breathe, the edges of which were paſted round his mouth by a mixture of turpentine and pitch. By weighing himſelf before and after going into the bag, aſcertaining the weight the bag had gained, and allowing, by calculation for what was carried off by reſpiration, he aſcertained that the quantity of matter perſpired in a minute, when at its maximum, amounted to 26·25 grains troy; and the minimum to nine grains: the medium of which is 17·63 grains in a minute, or 52·89 ounces in 24 hours. This does not differ much from the reſult of experiments previouſly made by Dodart, Keil, Rye, and others. Perſpiration is at its minimum immediately after taking food, and at its maximum during digeſtion. It is increaſed by drink, but not by ſolid food. It is greateſt in hot weather, and in the hot climates, or during violent exerciſe. If much be evacuated by urine, the perſpiration is proportionally leſs; and *vice verſa*.—To aſcertain the ſpecies of matter which paſſes off by inſenſible perſpiration is no eaſy matter, becauſe it is inviſible. From an experiment of Mr Cruickſhanks, it appears to conſiſt chiefly of water.—Carbon, oil, an acid, phoſphate of lime, and even urea, are alſo ſometimes emitted through the ſkin.

(2479.) The *ſenſible* perſpiration appears in a liquid form, and is known by the name of *ſweat*. How ſweat is produced is not known, but it is always produced in conſequence of expoſing the body to a high temperature, or to violent exerciſe. It is probable that ſweat carries off matters not only from the blood, but from the cellular membrane; becauſe thoſe who ſweat much ſoon become lean. Thoſe who wear flannel next their ſkin in warm weather, ſoon find it encruſted with a ſubſtance reſembling tallow.—Perſpiration, like the urinary ſecretion, beſides throwing off uſeleſs or pernicious ingredients from the blood, ſerves a very important purpoſe in regulating animal heat. Were the excitation of heat in the lungs not checked and balanced by perſpiration, it would ſoon increaſe to a degree which would prove fatal. The inſenſible perſpiration conſtantly carries off this dangerous exceſs of heat, and preſerves the body at an uniform temperature. Violent exerciſe occaſions a rapid circulation of the blood, quick breathing, and a conſequent increaſe of heat from reſpiration. But the exceſs of heat thus generated, is carried off, not only by inſenſible perſpiration, but by the exudation of ſweat, which evaporates from the ſkin. When the body is expoſed to a high temperature, the ſame effects enſue; and Mr Fordyce and his aſſociates aſcertained that men could live, without much inconvenience, in a temperature which exceeded the boiling point of water.

(2480.) Beſides the matters already deſcribed, animals are known to ſecrete from their ſkin an odorous ſubſtance, which is ſuppoſed to be of an oily nature. This is thought to be different in each individual, for a dog will follow his maſter from a great diſtance by means of his ſcent, and find him even in the midſt of a crowd. Dogs have been trained to return back, and fetch any thing their maſter had left behind when on a journey, even after a conſiderable time had elapſed. Foxes, hares, and animals of chaſe, emit a peculiar ſmell which conducts the dogs to their retreats; nay ſavages, who make much more uſe of their ſenſes than men in civilized life, are ſaid to diſtinguiſh their enemies from their friends by the ſmell of their footſteps in the graſs.

(2481.) When the hand, or any member of the body, is kept ſome time in a jar which is cloſed round it with a bladder, the oxygen in the air diſappears, and carbonic acid gas is ſubſtituted in its place. Some think this is owing to carbon emitted from the ſkin, which combines with the oxygen in the jar. Others think that the oxygen in the jar is abſorbed by the ſkin, and again thrown out in union with carbon.

(2482.) Though cold bathing alleviates thirſt, and Captain Bligh kept his men cool and in good health during his extraordinary voyage acroſs the South Sea, it does not appear, from the moſt accurate experiments that have been made, that water is abſorbed by the ſkin, unleſs the cuticle be removed.—But there are facts which ſeem to indicate that the ſkin is capable of abſorbing other ſubſtances, particularly if they be preſented to it in a gaſeous, or vapourific form. A very common illuſtration of this is, that if the hands be rubbed with garlic, the urine will have the ſmell of garlic next day.

IV. Assimilation.

(2483.) The blood being thus prepared and elaborated with ſo much care, each part of the animal attracts from it, and appropriates to itſelf, thoſe ingredients which are ſuited to its nouriſhment, and this proceſs is called *aſſimilation*. Thus phoſphate of lime and gelatine enter into the compoſition of the bones, fibrin of the muſcles, albumen of the cartilages, membranes, &c. Whether this proceſs be of a chemical nature, or by what means it is effected, are wholly unknown. But all parts of the body, the ſolid as well as the fluid, are perpetually running to waſte, and it is neceſſary that this ample proviſion ſhould be made for their conſtant repair.

(2484.) Each organ elaborates a peculiar matter, and if this matter be thrown into the organ ready formed, it paſſes without change. Thus the ſtomach elaborates chyme; but if chyme from the ſtomach of another animal be thrown in, it paſſes without change. The lower viſcera elaborate chyle from chyme, and from no other ſubſtance; but if milk, which reſembles chyle, be injected into them, it is abſorbed by the lacteals without change. Neither chyle, nor any other liquid, can be thrown into the blood veſſels without fatal effects; and it is neceſſary that the chyle which enters the ſubclavian vein ſhould be projected into the lungs, and there elaborated into blood, before it can be projected over the body, and contribute to the nouriſhment of the ſyſtem. Blood cannot be elaborated from any other material than chyle; but Lower firſt diſcovered, and the experiment has been often repeated, that the blood of one animal may be ſafely introduced into the blood veſſels of another, without undergoing any change. This transfuſion of the blood has been often recommended as a mean of renovating a debilitated conſtitution, where the whole maſs of blood is withdrawn, and in its place is ſubſtituted the blood of a healthy beaſt.—We do not know that it has ever been tried on the human ſpecies.—Mr J. Hunter alſo aſcertained that a piece of freſh fleſh may be engrafted on the muſcle of an animal, where it readily incorporates; and Buvina found that a piece of freſh bone may be engrafted on the bones, whether the animals be of the ſame or of a different ſpecies. Indeed, any ſubſtance, that is preciſely of the ſame kind, may be engrafted upon the correſponding parts of an animal. But if ſubſtances not of the ſame kind, be introduced into any part of the body, they either deſtroy that part, or prove fatal to the animal. There are ſome ſubſtances, ſuch as madder, indigo, and other colouring matters, which paſs through the ſyſtem without change, and depoſit their peculiar colours in the bones. Others, ſuch as arſenic, corrode and deſtroy the ſtomach and inteſtines, and overpower the vital energy. Other ſubſtances, if thrown into circulation, are perſpired through the ſkin, or ſecreted by the kidneys, without undergoing any aſſimilation. It is very remarkable that if a muſcle, a bone, or any other part of the body, be diſeaſed, or removed, or ruptured, the energy of the abſorbents in removing the diſeaſed parts is much increaſed, while a much greater proportion of the material neceſſary to repair the defect, than what is uſual, is elaborated in the blood. Whether this exceſs of a particular ingredient be derived from the nature of the food is uncertain; but it appears that a canary bird cannot perfect her eggs without eating chalk.

(2485.) It thus appears that there is a regular ſeries of chemical proceſſes going on in animals from the time their food enters their mouths, until it be aſſimilated, and becomes a part of their bodies. But the nature of theſe proceſſes, and the mode by which they produce their effects, are wholly unknown. There ſeems much reaſon to aſcribe part of the effects to the vital energy of the ſeveral organs, becauſe we cannot produce ſuch changes upon the materials out of the body. But how the organs operate is equally unknown. They ſeem to be endowed with a power of counteracting chemical cauſes, for the gaſtric juice never attacks or corrodes the ſtomach until after death.

SECT. II. DECOMPOSITION OF ANIMAL SUBSTANCES.

(2486.) When life ceaſes, chemical cauſes operate upon animal ſubſtances without reſtraint, and they undergo putrefaction. This proceſs only takes place upon complicated products. Such as contain only two or three ingredients, ſuch as oils, reſins, ſugar, are not ſubject to it. A certain degree of heat and moiſture are alſo neceſſary; for no animal ſubſtance ever putrifies, if kept at or above the freezing point, or if it be thoroughly dry. Though putrefaction is more rapid in the open air, animal ſubſtances putrify where air is excluded.—When fleſh putrifies its colour becomes gradually paler, it ſoftens, and its organization is deſtroyed. It emits a diſagreeable ſmell, which at laſt becomes ammoniacal. After the ammonia is diſſipated, a moſt offenſive ſmell is diffuſed around; which operates on animals as a ferment, and is very dangerous. At laſt it is changed into a ſoft brown or greeniſh matter, of the conſiſtence of a poultice. It is finally reduced into a friable matter reſembling earth. The gaſes emitted during this proceſs are chiefly hydrogen holding ſulphur, phoſphorus, and carbon in ſolution; ammonia, water, and carbonic acid, and perhaps alſo azotic gas. Nitric acid is alſo ſometimes formed and emitted. The earth-like reſiduum conſiſts of the fixed parts, mixed with charcoal, oil, and ammonia.

(2487.) Carcaſſes buried in the earth putrify more ſlowly. The abdomen becomes dilated with elaſtic fluids, and at laſt burſts, emitting a very fetid and noxious gas, along with a dark coloured liquid. If the ground be very dry, their moiſture is ſometimes abſorbed, and the bodies are converted into *mummies*. If a great number of bodies be heaped together, ſo as to exclude the external air, they putrify by the reciprocal action of their ingredients on each other. The ſoft parts are much diminiſhed in ſize, and are converted into a ſaponaceous matter, conſiſting of tallow combined with ammonia, with exceſs of tallow. This contains alſo ſome phoſphate of lime and ammonia. This was firſt diſcovered on removing the bodies from the burial ground of the Innocents at Paris, where they had become offenſive to the neighbourhood, and where it was uſual to throw 1000 or 1500 bodies into one pit. Dr Smith Gibbes found that animal muſcle, expoſed to a ſtream of water, acquired the ſame properties, and he gave it the name of *ſpermaceti*. Attempts were made to render this uſeful in all the manufactures which require tallow; but its diſagreeable ſmell ſeems to be an inſurmountable objection.—Putrefaction never takes place if the animal ſubſtances be kept at the freezing temperature. Hence the practice of keeping meat in ſnow or ice in the northern countries, and of ſending fiſh to London packed in ice. Bodies which have a ſtrong affinity for water retard putrefaction, ſuch as acids, ſugar, alcohol, &c. To this cauſe we may perhaps aſcribe the effect of common ſalt, nitre, &c. They combine with the water, and prevent from being decompoſed by the animal ſubſtance. Many aromatics, ſuch as camphor, reſins, volatile oils, bitumens, &c. retard putrefaction, and hence their utility in embalming.

SECT. III. ANIMAL PRODUCTS.

(2488.) The ſubſtances hitherto extracted from animals, are as follow:—

1. Gelatine
2. Albumen
3. Mucus
4. Fibrin
5. Urea
6. Saccharine matter
7. Oils
8. Reſins
9. Sulphur
10. Phoſphorus
11. Acids
12. Alkalies
13. Earths
14. Metals.

I. GELATINE.

(2489.) This ſubſtance is yielded by the bones, ligaments, tendons, muſcles, ſkin, hoofs, and moſt parts of animals. In order to obtain it in purity, it is only neceſſary to take part of the ſkin of an ox, and after the hair is removed, to waſh it repeatedly in cold water, until the water comes off colourleſs. The purified ſkin being now boiled in pure water, a conſiderable time, part of it will be diſſolved. The ſolution being now evaporated to a proper conſiſtence, and ſet aſide to cool, becomes ſolid, and forms the tremulous ſubſtance called *jelly*. This being allowed to dry ſlowly, becomes hard, ſemitranſparent, its fracture vitreous, and is what is known under the name of *glue*.

(2490.) When pure, gelatine is colourleſs and ſemitranſparent; hard and brittle. In cold water it ſwells very much and becomes again gelatinous, but does not diſſolve. If put into hot water, in its ſoft gelatinous ſtate it very ſoon diſſolves forming an opal coloured ſolution, opaque in proportion to the quantity of gelatine. When allowed to cool, the ſolution reſumes its original appearance of tremulous gelatine; and when paſſing into this ſtate, if agitated in cold water it becomes completely ſoluble. When kept dry it remains unchanged; but when diſſolved in water it ſoon putrefies. An acid is evolved, a fetid odour exhaled, and ammonia is formed.

(2491.) Expoſed to heat, when dry, it whitens, then blackens, and gradually conſumes to a coal. Diſtilled, it yields a watery liquid impregnated with ammonia, a fetid empyreumatic oil, and leaves a bulky charcoal.

(2492.) Acids readily diſſolve gelatine even when diluted, eſpecially when aſſiſted by heat. When nitric acid is digeſted upon it, ſome azotic gas, and then abundance of nitrous gas are diſengaged; the gelatine is diſſolved and converted into the oxalic and malic acids, excepting a ſmall quantity of oil which floats on the ſurface. Muriatic acid forms with glue a brown ſolution, which gradually lets fall a white powder. This ſolution precipitates tan from water, and is uſed as a teſt to detect the preſence of tan, even when combined with an alkali. Sulphuric acid ſlowly diſſolves tan with emiſſion of ſulphurous acid. Oxymuriatic acid gas, when paſſed through a ſolution of gelatine, converts it into a white inſoluble ſubſtance, lighter than, and inſoluble in, water. It is ſoluble in alkalies, eſpecially with heat, but the ſolution does not poſſeſs the properties of ſoap.

(2493.) Several metallic oxides, when agitated in ſolution of gelatine, combine, and form with it an inſoluble compound. Some metallic ſalts likewiſe form a precipitate with gelatine. When a ſolution of tannin is dropped into a ſolution of gelatine, a copious white precipitate enſues. This ſoon dries in the open air, forming a brittle ſubſtance, unſuſceptible of putrefaction, and reſiſting moſt of the chemical agents. It reſembles overtanned leather; and it is the combination of tannin with the gelatine in ſkins that converts them into leather. See TANNING. Mr Davy obſerved that this precipitate is again ſoluble in ſolution of gelatine. The ſolution of gelatine, or glue, is uſed to detect tannin in vegetable juices, as the decoction of tannin is uſed to detect gelatine in animal juices, from the precipitation which enſues when theſe ſolutions are mixed. A ſolution of gelatine ſo ſtrong that it gelatinizes when cold, anſwers beſt for throwing down tannin, and the gelatine ſolution when applied to detect tannin, ſhould be uſed while hot. When triturated with water and oils, gelatine forms a ſort of emulſion.

(2494.) *Glue* is a ſpecies of gelatine which may be made from moſt parts of animals, but the beſt is made from parings of hides, pelts from furriers, the hoofs and ears of oxen, ſheep, calves, &c. The ſkins of animals yield the beſt, and thoſe of old animals yield better glue than thoſe of young. The ſkins are firſt cleaned by digeſtion, in lime water, then ſteeped in clean water, and laid in heaps to drain. They are afterwards boiled in copper cauldrons, the impurities ſkimmed from the ſurface, and a little alum or finely powdered lime thrown in. The liquid is then drained through baſkets, allowed to ſettle; and the clear part being reſtored to the cauldron is boiled and ſkimmed until it attains the proper conſiſtency. It is then let into large horizontal coolers, where it forms a jelly on cooling. This is cut in ſlices with ſpades, which are afterwards cut into thin cakes with wires. Theſe cakes are laid upon coarſe horizontal nettings, under an open ſhed, where they dry by the lateral circulation of air. When glue is ſoluble in cold water, it is not good. But in cold water it ſwells and becomes gelatinous. Its colour is dark brown, with a degree of tranſparency. It is chiefly uſed for cementing pieces of wood together.

(2495.) *Size* is prepared in the ſame way, but with more care, from the ſkins of eels, horſes, cats, rabbits, from vellum, parchment, and ſome kinds of white leather. It is tranſparent, though of inferior ſtrength to glue. It enters into the compoſition of paper; is employed by the bleachers of linen, to give ſmoothneſs and elegance to cloth; likewiſe by gilders, poliſhers, and by painters to give adherence to what are called *water*, or *ſize* colours.

(2496.) *Iſinglaſs* is a delicious article of food in the countries where it is produced. It is chiefly obtained from the ſturgeon, and other large fiſhes, which abound in the lower parts of the Wolga, and other great rivers which diſembogue themſelves into the Black and Caſpian ſeas. Several large fiſhes in theſe quarters yield it, but the ſturgeon (*ſturio*) yields the beſt. It conſiſts of the air-bladder or ſoom of the fiſh, which being clean waſhed, the exterior membrane is removed. The body of the bladder is then cut length ways, formed into rolls, and dried in the air. Iſinglaſs is more difficult of ſolution in water than glue. The ſolution is tranſparent, and it is uſed for a great variety of purpoſes. In this country it is chiefly uſed for clarifying, or giving tranſparency to wines, porter and other fermented liquors. But the way it operates in theſe caſes has not yet been explained by chemiſts; nor does it ſeem to have attracted their attention. An inferior kind of iſinglaſs is prepared by boiling the heads, fins, tails, &c. of fiſhes without ſcales, ſuch as whales, cuttle fiſh, ſharks, porpoiſes &c. The boiling liquor muſt be frequently ſkimmed, and when properly concentrated it is thrown into flat coolers, where it conſolidates.

(2497.) *Portable Soup* may be regarded as a ſpecies of gelatine. It is boiled from the fleſh of animals, ſkimmed, and after attaining the proper conſiſtence, is let into coolers to conſolidate. It is then cut into ſlices and dried like glue. But it is not neceſſary to be over anxious to ſeparate all foreign ingredients from it, and ſome ſalt and ſpiceries are always mixed with it to prevent its putrefaction, even though it ſhould be expoſed to dampneſs. In fact gelatine is the baſis of all ſoups; and animal jelly forms the moſt pleaſant as well as the moſt nutritive, of any ſpecies of food.

II. ALBUMEN.

(2498.) This is the Latin name for the white of an egg, and it has been extended to all ſubſtances poſſeſſing ſimilar properties. The whites of eggs form a glary viſcid liquid, which is ſoluble in water, and the ſolution gives a green colour to vegetable blues, in conſequence of containing ſoda. At 165° albumen coagulates into a white maſs, which is ſolid in proportion to the time the heat has been applied. The coagulum is no longer ſoluble either in hot or in cold water. Acids and alcohol coagulate albumen as well as heat; but if it be ſufficiently diluted with water it does not coagulate by theſe agents. The coagulum is of the ſame weight and occupies preciſely the ſame ſpace, with the liquid albumen, and it does not appear that the conſolidation is carried either by the emiſſion or abſorption of any aerial fluid. Liquid coagulum dries in the air, and forms a tranſparent varniſh which is uſed by book-binders. The dried varniſh is ſoluble in water. The acid metallic ſalts when dropped into a filtered ſolution of albumen, occaſion precipitates of various colours, the metallic oxides forming inſoluble compounds with albumen. The oxymuriate of mercury is a very delicate teſt of the preſence of albumen in animal fluids. Tannin forms with it a yellow precipitate, which is inſoluble in water. When coagulated albumen is dried at 212°, it becomes hard and ſemitranſparent like horn; but becomes again ſoft and opaque after being digeſted in water. Mr Hatchett found that nitric acid converts coagulated albumen into gelatine. Boiling ſolution of potaſh converts albumen into ſoap. This ſubſtance is ſuppoſed to conſiſt of carbon, hydrogen, azote, and oxygen, combined in unknown proportions. It enters largely into the compoſition of animals, and in their ſolid parts it is in its coagulated ſtate. Its property of coagulating by heat renders it uſeful for clarifying liquids. The ſerum of blood, whites of eggs, or other liquids containing albumen, is mixed with the liquid to be clarified, and being heated it carries down all the looſe particles which were diffuſed through the liquid.

III. MUCUS

(2499.) May be obtained by evaporating ſaliva, or by macerating oyſters in water, and then evaporating to dryneſs. It is ſoluble in water, does not coagulate, and in its properties very much reſembles gum arabic.

IV. FIBRIN.

(2500.) This ſubſtance exiſts only in the blood and in the muſcles of animals. When blood is allowed to ſettle, a thick red clot forms in it, and falls to the bottom. This clot being ſeparated, put into a linen cloth, and waſhed until the water comes off without either colour or taſte, what remains on the cloth is *fibrin*. Mr Hatchett having minced ſome lean beef, during cold weather, ſteeped it in water during fifteen days, each day changing and ſqueezing out the water. The ſhreds of muſcle, amounting to about three pounds in weight, were now boiled in ſix quarts of freſh water during five hours each day, for three weeks, the water being changed and preſſed out each day. What remained being dried by the heat of a water-bath, was fibrin nearly pure.

(2501.) This ſubſtance is of a white colour, is inſoluble in water and alcohol, and has neither taſte nor ſmell. It is not apt to putrify, even when kept under water. It contracts ſuddenly by heat, emitting a ſmell of burning feathers. With a ſtronger heat it melts, and expoſed to deſtructive diſtillation it yields water, carbonate of ammonia, a heavy fetid oil, carbonic acid, and carbureted hydrogen gas. A more copious charcoal is left, than by gelatine or albumen, which contains phoſphates of ſoda and of lime. Acids diſſolve fibrin, and many of its acid ſolutions are gelatinous. The vegetable acids require to be aided with heat. Weak nitric acid diſengages from it much azotic gas. Concentrated potaſh and ſoda, by boiling, convert it into a brown ſoap, from which muriatic acid precipitates the fibrin in a form reſembling tallow. In its properties it ſeems much to reſemble coagulated albumen, with perhaps an exceſs of carbon. Nitric acid converts both into gelatine.

V. UREA.

(2502.) Is obtained by ſlowly evaporating to the conſiſtence of thick ſyrup, a quantity of human urine that had been voided ſeveral hours after a meal. By cooling it concretes into a cryſtalline maſs; upon which pour, at different times, four times its weight of alcohol, and apply a gentle heat. The urea diſſolves on the alcohol, and the ſolution being ſeparated from the undiſſolved ſalts, is put into a retort and diſtilled with a gentle heat, until it acquires the conſiſtence of thick ſyrup. The alcohol is now ſeparated, and what remains is *urea*, which cryſtallizes on cooling in the form of thick plates croſſing each other. It is of the conſiſtence of thick honey, of a yellowiſh white colour, and its ſmell reſembles that of garlic or arſenic. It deliqueſces, and is more ſoluble in water than in alcohol. Nitric acid precipitates from its watery ſolution a great number of bright pearl coloured cryſtals, compoſed of the acid and urea. When heated it melts, ſwells, emits a moſt diſagreeable ſmell. When diſtilled it yields firſt benzoic acid, then cryſtals of carbonate of ammonia, carbureted hydrogen gas, with ſome pruſſic acid and oil. There remains charcoal, muriate of ammonia and of ſoda. When long boiled in water which is replaced as it evaporates, urea is alſo decompoſed. A great quantity of carbonate of ammonia ſeparates, acetic acid is formed, and charcoal precipitated. Its ſolution in water, eſpecially if a little gelatine be added, is ſubject to a gradual ſpontaneous decompoſition,

ion, with diſengagement of much ammonia. From the experiments of Fourcroy and Vauquelin, it is inferred that urea is compoſed of

39.5	oxygen
32·5	azote
14·7	carbon
13.3	hydrogen
100·0	

VI. Saccharine Matter.

(2503.) The Saccharine matters, or ſugars, found in animals, are

1. . . . . . . Sugar of milk
2. . . . . . . Honey.
3. . . . . . . Diabetic urine.

(2504.) *Sugar of milk* is obtained by evaporating freſh whey to the conſiſtence of honey, allowing it to concrete by cooling, and then diſſolving it in water. The ſolution being clarified with white of eggs, filtered, and evaporated to the conſiſtence of ſyrup, it depoſits on cooling ſemi-tranſparent parallelopiped cryſtals, which are terminated by four-ſided pyramids. Theſe cryſtals are ſugar of milk, which differs in ſome of its properties from other kinds of ſugar.

(2505.) *Honey*, according to Cavezzali, is compoſed of ſugar, mucilage, and an acid.—To ſeparate the ſugar, the honey is melted, and carbonate of lime in powder added as long as effervèſcence appears; the liquid being frequently ſkimmed while hot. On cooling it depoſits cryſtals of ſugar.—It ſeems doubtful whether honey, which bees collect from vegetables, ſhould be ranked as an animal or vegetable product. Prouſt thinks there are two kinds of honey, one always liquid, the other ſolid and not deliqueſcent, and that they may be ſeparated by alcohol.

(2506.) *Diabetic ſugar* is extracted from the urine of perſons who labour under the diſeaſe called *diabetes*. Such urine yields a conſiderable proportion of ſugar, commonly about a twelfth of its weight. The ingenious Dr Cooper at Glaſgow ſhewed us a very large quantity of this ſugar which he had extracted from the urine of a patient. Its colour, taſte, and granulation were ſuch that it could not be diſtinguiſhed from the raw or muſcovado ſugar of the Weſt Indies. But it is ſaid not to cryſtallize like common ſugar, and hence ſeems to differ from it in ſome reſpects.

VII. Oils.

(2507.) As we entered largely into this ſubject when treating of oils and ſoaps, only a few ſhort remarks ſeem neceſſary here.—The moſt important animal oils are.

(2508.) *Spermaceti*, which is chiefly extracted from the cranium of the *phyſeter mocrocephalus*, or ſpermaceti whale, an animal which abounds in the ſouthern ocean. It is ſeparated from a liquid oil by means of a woollen bag, the remainder of which is extracted by an alkaline ley, and the ſpermaceti is afterwards fuſed. It forms a beautiful white ſcaly ſubſtance, brittle, with ſcarcely taſte or ſmell. It makes excellent candles, and is much uſed in medicine. It melts at 112°, and is ſaid to diſſolve caoutchouc when liquid, and that the compound forms an excellent luting for veſſels.

(2509.) *Fat, Tallow, Suet, Hog's lard, Butter.*—These differ, in ſome particulars, from each other; but they all ſeem to be only varieties of the fixed oils. When hog's lard is diſtilled it firſt yields water, then a white oil, with ſome acetic and ſebacic acids. Abundance of the carbureted hydrogen and carbonic acid gaſes come over, with a moſt offenſive ſmell. When the veſſels are unluted the ſmell is deteſtable, and intollerable. There remains in the retort a black coaly maſs. When a little nitric acid is poured upon fat, and a moderate heat applied, it is converted into a yellow ointment, which Fourcroy conſiders as oxide of fat. This is ſaid to have been ſucceſsfully employed in France, in external venereal affections.

(2510.) *Train oil*, is extracted from the blubber of the whale and other fiſhes. The livers of the dog-fiſh yield a much purer oil than that obtained from whales.—At firſt it is thick, but after depoſiting a mucilaginous matter, it becomes tranſparent, and of a reddiſh brown colour. This oil is much uſed for burning in lamps, and as it has a diſagreeable ſmell, it may be purified by agitation with a little ſulphuric acid, and then mixing it with water. After being allowed to ſettle, the oil ſwims on the ſurface, of a lighter colour than before, the water continues milky, and a curdled matter is ſeen between the water and the oil. The oil being drawn off has no diſagreeable ſmell when burned in lamps.

(2511.) *The Animal oil of Dippel*, is a ſpecies of volatile and aromatic oil which is obtained by diſtillation chiefly from the horns and albumen of animals. The product of the firſt diſtillation is mixed with water, and diſtilled a ſecond time. It changes ſyrup of violets to green, owing to its containing ammonia. It was formerly much celebrated as a medicine, but is now in little repute.

VIII. Animal Resins.

The principal animal reſins are

(2512.) *Reſin of Bile.* This is obtained by pouring one part of concentrated muriatic acid into 32 parts of freſh ox bile. After the mixture has ſettled, it is paſſed through a filter, and the filtered liquor evaporated in a glaſs veſſel with a moderate heat. After it is ſufficiently concentrated, a green ſubſtance falls down. The liquid part being poured off, and the precipitate waſhed with water, it is *reſin of bile*.—It is of a dark brown colour, but when ſpread upon wood or paper, is of a fine graſs green, and mixed with eſſential oil, might form a beautiful green varniſh. It is of a very bitter taſte; is ſoluble in water and alcohol, and alkalies form it into a ſoap. Treated with oxymuriatic acid, it combines with oxygen, loſes its green colour, and is converted into a ſubſtance reſembling tallow.—*Ear-wax* alſo contains a reſin, which has not been particularly examined, as nature only furniſhes this ſubſtance in ſmall quantity. It is abhorred by inſects, and placed as a centinel to defend the drum of the ear againſt their attacks.

(2513.) *Ambergris* is now generally underſtood to be a concretion formed in the ſtomach of the ſpermaceti whale. It is often found floating on the coaſts of India, Africa, and Brazil, in ſmall pieces; but ſometimes in maſſes of 50 or 100 lbs. Great quantities of it have been occaſionally found upon the ſhores of ſome of the Hebridian iſles, where the floating productions of the torrid zone are often conveyed by currents in the ocean, and the people not knowing its value, uſed it for ruſh lights.—It is of an aſh-grey colour, with white and browniſh yellow ſtreaks. It has no taſte, but an agreeable ſmell, which improves by keeping. It melts at 122°, and riſes in vapour at 212°. Diſtilled it yields a white acid liquor, and a light volatile oil; while a bulky charcoal remains behind. It is inſoluble in water, but ſoluble in ether and alcohol. It is ſoluble in nitric acid, and in the alkalies, which convert it into ſoap.—According to Bouillon La Grange, 100 parts of ambergris are compoſed of

52·7 adipocire (a ſubſtance intermediate between tallow and wax,)
30·8 reſin,
11·1 benzoic acid,
5·4 charcoal.
———
100·0

(2514.) *Caſtor* is obtained from two bags ſituated in the inguen of the beaver, the ſmalleſt bag yielding the beſt. It is much uſed in medicine, to lubricate the bowels, allay inflammation, and to diſcharge hardened feces. According to Bouillon La Grange it is compoſed of

1. Carbonate of potaſh,
2. Carbonate of lime,
3. Carbonate of ammonia,
4. Iron,
5. Reſin, ſimilar to that in bile,
6. Extractive mucilage,
7. Volatile oil.

(2515.) *Civet* is obtained from the inguen of the civet cat. In colour and conſiſtence it reſembles butter. Its ſmell is ſo ſtrong that it is inſufferable unleſs it be diminiſhed by mixture with other bodies. It is uſed as a perfume, or rather as a ſtink. It combines with oils, but not with alcohol.

(2516.) *Muſk* is obtained from the quadruped called *moſchus moſchifer*. It conveys its ſmell to water, and is ſoluble in alcohol, but the combination has not the ſmell of muſk. The ſame is the caſe with its ſolutions in the nitric and ſulphuric acids.—This ſubſtance is alſo uſed as a ſtink.

IX. X. SULPHUR.—PHOSPHORUS.

(2517.) Sulphur ſeems always to be a component part of albumen, in whatever part of the body this ſubſtance may exiſt. It ſometimes exhales from the ſkin, but this ſeems only to happen in conſequence of diſeaſe.—The light which putrid fiſh, and ſometimes fleſh, is ſeen to exhibit in the dark, is ſuppoſed to be owing to phoſphorus eſcaping in union with hydrogen gas. But this fact ſeems more eaſily accounted for by reference to putrifaction, which is a ſlow inflammation, and which occaſions an emiſſion of light without any ſenſible heat. Moſs, rotten wood, and a variety of ſubſtances, in which no phoſphorus is known to exiſt, ſhine in the dark, if moiſtened and expoſed to the air.

XI. ACIDS.

(2518.) The acids which have been hitherto found in animals are the following,

1. Phoſphoric,
2. Sulphuric,
3. Muriatic,
4. Carbonic,
5. Benzoic,
6. Uric,
7. Roſacic,
8. Amniotic,
9. Oxalic,
10. Formic,
11. Acetic,
12. Malic.

Having explained the properties of theſe acids, and the mode of procuring them, when treating of acids, we ſee no reaſon for repeating what was then ſaid in this place.—Any additional remarks, which may appear uſeful, ſhall be exhibited when we come to treat of the *Parts of Animals*.

XII. XIII. XIV. ALKALIES, EARTHS, METALS.

(2519.) Potaſh is found in the milk of cows, and abounds in the urine of quadrupeds.—Soda occaſions animal fluids to change vegetable blues into green. It ſeems always to form an ingredient in albumen; and is often combined with the phoſphoric and muriatic acids.—Ammonia has been detected in freſh urine and is always formed during the putrefaction of moſt animal ſubſtances.

(2520.) Lime abounds in animals. Combined with phoſphoric acid, it forms the baſis of bones; and phoſphate of lime is held in ſolution by moſt of the fluids, and enters into the compoſition of the muſcles, and other ſolid parts. The ſhells of fiſhes, which are their bones, are compoſed of carbonate of lime.

(2521.) Magneſia has been found in human urine, and in urinary calculi.

(2522.) Silica has been found in hair, and in urinary calculi. It alſo forms ſmall cryſtals in the pineal gland, ſituated in the center of the brain, and long ſuppoſed to be the ſeat of the ſoul. How it gets there defies explanation.

(2523.) The only metals yet found in animals are iron and mangancſe. Iron is found in the blood, and in bile juice. Manganeſe has only been found in human hair.

SECT. IV. PARTS OF ANIMALS.

(2524.) The parts of which animals are compoſed are divided into *ſolid* and *fluid*. The ſolid parts are

1. Bones, ſhells, cruſts,
2. Horns, nails, ſcales,
3. Muſcles,
4. Skin,
5. Membranes,
6. Tendons and ligaments,
7. Glands,
8. Brain and nerves,
9. Hair and feathers,
10. Silk, &c.

I. BONES, SHELLS, CRUSTS.

(2525.) The bones of animals are their moſt ſolid parts, and they are generally concealed from view. When bones are reduced to ſmall pieces, and ſufficiently boiled in water, they yield a portion of fat which ſwims on the ſurface, and of gelatine which remains diſſolved in the water, but when ſufficiently concentrated it conſolidates on cooling. Hence bones, when reduced to powder, and boiled, yield excellent ſoup. If an entire bone have its fat and gelatine removed by boiling, and be afterwards ſteeped in a diluted acid, the earthy baſis of the bone is withdrawn and there remains a ſoft white elaſtic ſubſtance, of the figure of the bone, which has obtained the name of *cartilage*. Mr Hatchett has ſhewn that this ſubſtance poſſeſſes all the properties of coagulated albumen. This cartilage is the firſt part of the bone that is formed, and hence bones are at firſt ſoft and flexible, and the earthy ſalts which give them hardneſs are depoſited afterwards. Gelatine and fat convey toughneſs and ſtrength to bones, and without them, eſpecially the firſt, they are extremely brittle. The earthy ſalts which convey hardneſs and ſolidity to bones, are 1. Phoſphate of lime, which is by far the moſt abundant. 2. Carbonate of lime. 3. Phoſphate of magneſia, in the bones of inferior animals. 4. Sulphate of lime detected by Mr Hatchett in very minute proportion.—The following is the analyſis of ox bones by Fourcroy and Vauquelin,

Solid gelatine	. .	51
Phoſphate of lime	.	37·7
Carbonate of lime	.	10
Phoſphate of magneſia		1·3
		100·0

The enamel of the teeth contains no cartilage, and according to Fourcroy and Vauquelin, is compoſed of—

Phoſphate of lime	. .	72·9
Gelatine and water	. .	27·1
		100·0

But according to Mr Pepys and Hatchett, it is compoſed of—

Phoſphate of lime	.	78
Carbonate of lime	.	6
Loſs and water	.	16
		100

Mr Hatchett found ſome foſſil bones from the rock of Gibraltar to conſiſt of phoſphate of lime, with carbonate of lime in the interſtices. Hence they reſemble bone that have been burnt.

(2526.) *Shells* are the bones or covering of a great variety of fiſhes. Shells conſiſt chiefly of carbonate of lime united to a ſoft animal matter. The carbonate of lime predominating in ſhells diſtinguiſhes them from bones in which phoſphate of lime predominates. Shells are divided into two genera, the *porcellanous*, and *mother-of-pearl*. The porcellanous, ſuch as *voluta*, *cyprea*, &c. are compact, and break like porcelain; and conſiſt of carbonate of lime united to a ſoft animal matter. The mother of pearl ſhells, ſuch as the *freſh water muſcle*, the *haliotis iris*, the *turbo olearius*, &c. conſiſt of alternate layers of carbonate of lime and fine membranes compoſed of coagulated albumen. Acids extract the carbonate of lime, leaving the membranes, and the form of the ſhell entire. The oyſter ſhell contains a very ſmall proportion of the albuminous membrane, while the real mother of pearl ſhell contains, according to Mr Hatchett, to whom we have been under ſo many obligations,

Carbonate of lime	. .	66
Membrane	. . . .	34
		100

Pearl is a globular concretion often formed in theſe ſhells. It is a beautiful bluiſh white colour, and is compoſed of alternate and concentric coats of membrane and carbonate of lime. Its lamellar ſtructure renders it irrideſcent.

(2527.) *Cruſts* are the external covering of *crabs*, *lobſters*, *prawns*, *cray-fiſh*, *echini*, and various ſimilar fiſhes. From Mr Hatchett's experiments they ſeem to be intermediate between bones and ſhells. They agree with bones in containing phoſphate of lime, and they agree with ſhells in the predominance of carbonate of lime. They alſo contain cartilage poſſeſſing the properties of coagulated albumen.—From lobſter cruſt Merat-Guillet obtained—

Carbonate of lime	.	60
Phoſphate of lime	.	14
Cartilage	. .	26
		100

From cruſt of cray fiſh

Carbonate of lime	.	60
Phoſphate of lime	.	12
Cartilage	. .	28
		100

From ſhells of hens eggs

Carbonate of lime	.	89·6
Phoſphate of lime	.	5·7
Animal matter	.	4·7
		100·0

II. Horns, Nails, Scales.

(2528.) Theſe ſubſtances are flexible, elaſtic, and ſoften by heat, which is not the caſe with thoſe juſt deſcribed. *Horns* may be cut with a knife, or raſped with a file; but are ſo tough they cannot be pounded. When heated they become ſoft and pliable, and may be formed into almoſt any ſhape. When formed into thin plates, they poſſeſs a degree of tranſparency, and are often uſed inſtead of glaſs for windows and lanterns. When ſtrongly heated in a Papin's digeſter they are ſaid to be converted into a ſubſtance reſembling gelatine. Mr Hatchett burnt 500 grains of ox horn. The reſiduum was only 1·5 grains, not one half of which was phoſphate of lime. Hence horns contain very little earthy matter. They ſeem to conſiſt chiefly of coagulated albumen, and probably alſo of gelatine. The only exception is the horn of the hart and buck, which ſeem intermediate between bone and horn.—The hoofs, talons, and claws of animals ſeem to be the ſame with horns. To the ſame claſs may alſo be referred the bills of birds, the weapons of the ſword- and ſaw-fiſh, though many of theſe ſeem much harder than horns. They all agree in uniting a fibrous with a lamellated, or membraneous texture.

(2529.) *Nails* defend the extremities of the fingers, are attached to the epidermis, and come off along with it. Water ſoftens, but concentrated acids and alkalies diſſolve and decompoſe them. Mr Hatchett aſcertained that they conſiſt of coagulated albumen, and a ſmall proportion of phoſphate of lime. *Tortoiſe ſhell* ſeems to approach to the nature of *nail*. When burnt, 500 grains of it yield three of earthy matter, conſiſting chiefly of phoſphate of lime and ſoda, with a little iron.

(2530.) *Scales* are of two kinds. Thoſe of ſerpents and other amphibious animals, bear a ſtriking reſemblance to horn; while thoſe of fiſhes reſemble mother of pearl. The cruſts which cover certain inſects ſeem to reſemble the ſcales of ſerpents.

III. Muscles.

III. MUSCLES.

(2531.) The muſcles of land animals are known by the name of *fleſh*; and thoſe of animals which inhabit the ſea are known by the name of *fiſh*. Muſcles conſiſt of bundles of fibres, which may be ſubdivided into ſmaller fibres, and the minuteſt fibre until it ceaſes to be ſeen by the beſt microſcope, is always inveſted with a coating of cellular ſubſtance, or fat. As the muſcles are the moving powers of the animal frame, the intention of this fat is to prevent the friction of the muſcular fibres upon each other, which would inſtantly prove fatal to the animal. When a piece of fleſh is minced down, and treated as was explained when diſcuſſing fibrin, the muſcle is converted into a white fibrous ſubſtance, compoſed chiefly of fibrin. Its other ingredients are

1. Albumen
2. Gelatine
3. Extractive
4. Phoſphate of ſoda
5. Phoſphate of ammonia
6. Phoſphate and carbonate of lime.

It is obvious that when meat is boiled, the gelatine, the extractive, and ſome of the ſalts will be diſſolved in the water; and from theſe the nouriſhment and flavour of ſoups are derived. When meat is roaſted, theſe ſubſtances continue in it; and hence the ſuperior flavour of roaſted meat. But much of the nouriſhment of roaſted meat is expelled by exceſſive heat, as any one may perceive by the ſmell; and the moſt economical mode of dreſſing meat is long and ſlow boiling.

IV. SKIN.

(2532.) This is a coating which covers all animals, excepting thoſe which are covered with ſhells, and it has properties in common with the bark of trees. It conſiſts of three membranes.

(2533.) The *epidermis* may be ſeparated by ſteeping in hot water. It is elaſtic, and inſoluble in water and alcohol, but ſoluble in alkalies and lime. It is tinged yellow by nitric acid, which volatile alkali changes to a deep orange colour. The epidermis ſeems to be a particular modification of coagulated albumen.

(2534.) The *rete mucoſum* is a very thin membrane below the epidermis, in which the colour of the ſkin reſides. The negroes acquire their blackneſs from a pigment lodged in this membrane. If a negro keep his hand or foot ſome time in water impregnated with oxymuriatic acid, it becomes nearly white; but the former colour afterwards returns. The compoſition of this membrane is not known, as its quantity is very ſmall.

(2535.) The *cutis*, or real ſkin, is a thick denſe membrane, compoſed of fibres interwoven ſimilar to thoſe of a hat. It conſiſts chiefly of gelatine ſo compact as to reſiſt the action of cold water; but when long boiled in water it diſſolves and forms glue. Thoſe ſkins make the beſt glue which are of moſt difficult ſolution in boiling water.—To form ſkins into leather, they are firſt ſteeped in lime and water, and the hair and cuticle ſcraped off. They are then well waſhed in water. To make ſole leather, the thickeſt and ſtrongeſt ſkins are ſteeped in ſaturated infuſion of bark; or the ſkins and bruiſed bark are placed in alternate layers, and as much water added as covers them. The ſkins are afterwards ſteeped in water ſlightly impregnated with ſulphuric acid, or in the acid obtained from the fermentation of barley or rye, which Mr Davy thinks produces a triple compound of *ſkin*, *tan*, and *acid*. Oak bark contains *tannin* and *extractive*; and when a ſtrong infuſion of it is made, the tannin ſuperabounds. This renders the ſkin hard, but apt to crack and a different proceſs is adopted for making pliable leather. For this purpoſe, the thin ſkins of cows, calves, &c. are firſt ſteeped ſome days in a lixivium of pigeon's dung, which renders them thinner and ſofter. They are then ſteeped at firſt in weak infuſions of oak bark, and are gradually removed to thoſe which are ſtronger and ſtronger until they be completely impregnated; which takes from two to four months. From this proceſs they imbibe a greater proportion of extractive than the ſole leather, and are thus rendered pliable and tough. Mr Davy found that ſkins while tanning abſorb about ⅓d of their weight of vegetable matter. The tannin combines with the gelatine in the ſkin, renders it inſoluble in water, and not diſpoſed to putrify. Mr Davy found that ſkins abſorb the whole vegetable matter from infuſion of bark, leaving nothing but pure water.

V. MEMBRANES, TENDONS, LIGAMENTS, GLANDS.

(2536.) *Membranes* are thin, ſemitranſparent ſubſtances which envelope the viſcera, and other parts of the body, ſuch as the dura and pia mater, the pleura, the peritoneum, the perioſteum &c. They alſo form reſervoirs for the reception of juices which are to be afterwards diſcharged, of which we have examples in the gall and urinary bladders. Though little is known of their chemical compoſition, they ſeem to be perfectly analogous to ſkin. A bladder being tanned is converted into leather.

(2537.) *Tendons* are ſtrong pearl coloured bodies, in which the muſcles terminate, and by which they are inſerted into the bones. By long boiling they are converted into gelatine, and ſeem to be of the ſame nature with ſkin.

(2538.) *Ligaments* bind the bones together at the joints. When long boiled they yield a portion of gelatine; but the remainder reſiſts the action of boiling water, and ſeems to conſiſt of coagulated albumen.

(2539.) *Glands* operate in forming or in altering different liquids. They are divided into *conglobate*, which are ſmall, and ſituated in the courſe of the lymphatics, and *conglomerate* ſuch as the liver, kidneys, &c. Of their chemical compoſition nothing is known.

VI. BRAIN AND NERVES.

(2540.) The nerves are ſuppoſed to be only extenſions and ramifications of the brain and ſpinal marrow. Theſe are the inſtruments of ſenſation, and of motion; for though the muſcles be the moving powers of the body, they do not act if the nerves which communicate with them be cut or diſeaſed. The brain conſiſts of two ſubſtances, which ſeem only to be diſtinguiſhed from each other by their colour. The outer matter having the colour of wood aſhes, is called the *cineritious*;

the inner matter is called the *medullary* part. Brain has a ſoft feel and cloſe texture. If kept in cloſe veſſels whence air is excluded, it remains a very long time without alteration. But if expoſed to the air at the temperature of 60°, it ſoon emits a ſhocking ſmell, becomes acid, aſſumes a green colour, and afterwards forms a great quantity of ammonia. Triturated with cold water in a mortar, it forms a homogeneous emulſion, which coagulates at 145°. The ſulphuric and nitric acids, and alcohol, when added to the emulſion cauſe it to coagulate. Thouret and Fourcroy are the only chemiſts who have made experiments upon brain, and it appeared to them to conſiſt of a peculiar ſubſtance which in many reſpects reſembles albumen. It contains alſo phoſphate of lime, of ſoda, and of ammonia.

VII. Hair, Wool, Feathers.

(2541.) Hair and wool grow on various parts of animals, and are intended to defend them from the cold. Their ſurfaces are not ſmooth, but covered with ſcales conſiſting of imbricated cones, which give them a rough feel, occaſion them to entangle and have given riſe to the proceſſes of *felting* and *fulling*. When hair is long boiled in water it yields gelatine, to which it owes its flexibility and toughneſs. What remains is brittle, and ſeems to conſiſt of coagulated albumen. The ſofteſt hair yields gelatine moſt readily. Vauquelin diſſolved human hair of various colours in water in a Papin's digeſter. If the heat was too great it was decompoſed, and ammonia, carbonic acid, and empyreumatic oil formed. After being diſſolved it ſlowly depoſited a bituminous oil, which was black when black hair, and yellowiſh red when red hair was employed. It would ſeem that the colour of hair is owing to an oil. When the oil is ſeparated by filtration, the ſolution is nearly colourleſs, and infuſion of nutgalls, and oxymuriatic acid, occaſion copious precipitates in it. But though it be much reduced by evaporation, it does not gelatinize. The alkaline lixivia readily diſſolve hair, and hence wool was propoſed by Chaptal as a ſubſtitute for oil in the compoſition of ſoap. The ſulphuric, muriatic, and nitric acids diſſolved hair, with a ſeparation of oil. Alcohol digeſted on hair ſeparates two kinds of oil, the firſt white, the ſecond of the colour of the hair. When hair is burnt to aſhes, it yields iron and manganeſe, phoſphate, ſulphate, and carbonate of lime, muriate of ſoda, and a conſiderable portion of ſilica. The aſhes of white hair contain leaſt iron, but ſome magneſia which is wanting in hair of other colours.—From the experiments of Vauquelin it appears that black hair is compoſed of the following ſubſtances.

1. Animal matter, conſtituting the greateſt part,
2. White ſolid oil, in ſmall quantity,
3. Greyiſh green oil, more abundant,
4. Iron,
5. Oxide of manganeſe,
6. Phoſphate of lime,
7. Carbonate of lime, very ſcanty,
8. Silica,
9. Sulphur.

Vauquelin conſiders the animal matter to be
chiefly a variety of inſpiſſated mucus, l
cipitation by tannin ſeems to contradic
nion. Mr Hatchett thinks the quills
conſiſt chiefly of coagulated albumen,
other parts to be nearly of the ſame c
with hair, though when boiled they yi
ſatine.

VIII. Silk.

(2542.) The ſilk worm is a native
and there the preparation and manufac
have been known from the remoteſt tim
firſt brought to Rome in the time of Aug
it continued to be carried over land, a
the luxurious Romans for its weight in
555 two Perſian monks brought ſome e
inſect to Conſtantinople, concealed in t
of a cane. Being carefully propagated,
facture of ſilk ſoon extended itſelf in G
1130 Roger King of Sicily forcibly carr
weavers from Greece, and ſettled them
from which the manufacture extended
and afrerwards into France. The rev
the Edict of Nantes extended the ſilk ma
into Britain.

(2543.) Silk is produced by various
the caterpillar. The *phalena bombyx* is
propagated in Europe; but the *phalena*
a greater quantity. The inſects feed on
of the white mulberry tree. It is protr
two ſmall bags, in fine threads, forme
ſhape of a clue, to cover the inſects in t
lis ſtate. The threads and webs of ſpi
the ſame nature with ſilk, and Reaumu
ed that the threads of the larger ſpiders
ther inferior in beauty nor ſtrength to t
ſilk worm. Attempts were made to eſt
nufactories of this kind of ſilk, but the
tacked and deſtroyed each other.

(2544.) Raw ſilk varies in colour f
to a reddiſh yellow. The ſurface of its f
is covered with a varniſh, which may b
by boiling in water, or by ſoap, when
a fine white colour. This varniſh ſeems
termediate between gum and gelatine.
with gum in not being acted on by alc
with gelatine in being precipitated from
tannin. When the water is evaporated t
is obtained of a black colour, brittle,
ſhining fracture, and its weight is nearl
of that of the raw ſilk from which it wa
ed. Its ſoapy ſolution ſoon putrifies.
contains a reſin, which is ſoluble in alc
a mixture of alcohol, or in a muriatic
when deprived of it, the ſilk acquires a
colour.

(2545.) Silk itſelf is not ſoluble in w
cohol and is not very combuſtible, th
blackens and decompoſes it. Diſtilled
very great proportion of ammonia. He
lies diſſolve, and convert it into ſoap.
phuric, muriatic and nitric acids alſo d
the latter with evolution of oxalic acid,
ty matter which ſwims on the ſurface.
in a damp place, it rots ſooner or late
Wilſon of Falkirk lately found a ribbon
round the bone of an arm, which had

than eight years in the church-yard of that town. The body of the deceaſed had mouldered into earth leaving nothing but the bones. This ſhews that ſilk is capable of reſiſting putrefaction, when not expoſed to the action of the air.—We have no analyſis of ſilk, but Cadet has lately analyſed ſpiders webs, which ſeem to be nearly allied to ſilk, by treating them with water, alcohol, and incineration, and obtained the following products. 1. Brown extract ſoluble in water, and not altered by expoſure to the air. 2. Reſinous matter ſoluble in alcohol. 3. Alumina. 4. Sulphate of lime. 5. Carbonate of ſoda. 6. Muriate of ſoda. 7. Carbonate of lime. 8. Iron. 9. Silica.

(2546.) Having thus preſented an outline of what is known concerning the ſolid parts of animals, we now proceed to the conſideration of their fluid parts. The fluid parts of animals are the *Blood*, which is the great reſervoir from which all the other fluid, as well as ſolid parts of animals are extracted. The other fluid parts are called *ſecretions*, becauſe they are ſecreted from the blood. —The morbid concretions which are formed in various parts of the body, and the morbid fluids, ſhall be afterwards conſidered. At preſent we only conſider thoſe ſolid and fluid parts of animals which are formed while they are in a healthy ſtate. Theſe fluids may be reduced to the following.

BLOOD.

SECRETIONS.

1. Milk
2. Eggs
3. Saliva
4. Pancreatic juice
5. Bile
6. Cerumen
7. Tears
8. Liquor of the pericardium
9. Humours of the eye
10. Mucus of the noſe &c.
11. Sinovia
12. Semen
13. Liquor of the amnios
14. Animal poiſons.

Some fluids are ſecreted from the blood, and afterwards ejected from the body. Theſe are called *excretions* the principal of which are

15. Urine
16. Feces.

SECT. IV. BLOOD.

(2547.) Though blood from its importance in the animal economy, has been a ſerious object of attention with phyſicians and chemiſts almoſt innumerable, very little is yet known concerning its chemical ingredients. The ſpecific gravity of human blood, at a medium is 1·0527; and according to Fourcroy, that of Bullock's blood at 60° is 10556. But the ſpecific gravity of blood varies conſiderably in the ſame animal.

(2548.) When blood is drawn from an animal, it gradually ſeparates into two parts. One of theſe remains liquid, and has the colour, and nearly the conſiſtence of freſh whey, and is hence called *Serum*. The other from its red colour, being ſuppoſed to carry all the eſſence of the blood along with it, has obtained the name of *Cruor*. The cruor has the conſiſtency of curds when immediately precipitated from milk; and hence the older phyſicians diſtinguiſhed the ingredients into which blood voluntarily ſeparated by terms which denoted what took place in milk; that is into *curds* and *whey*.—This ſeparation takes place though the blood be kept at the ſame temperature which it had in the body of the animal; though it ſhould be mixed with water, or be placed in vacuo. Though we are entirely ignorant of what takes place in the bodies of animals, it ſeems to follow, from theſe facts, that the decompoſition of blood, in animals, is prevented by its conſtant projection through all parts of the ſyſtem by the muſcular power of the heart and arteries. But we have two ſubſtances in blood which deſerve attention—the *ſerum* and the *Cruor*.

(2549.) The *ſerum* of blood is of a light greeniſh yellow colour, and converts ſyrup of violets to a green, owing to ſoda diſſolved in it. At the temperature of 156° it coagulates, and alſo when boiling water is mixed with it. But if previouſly mixed with ſix parts of cold water, it does not coagulate by heat. The coagulum reſembles the boiled white of an egg; and if cut into ſmall pieces, a muddy fluid, termed *ſeroſity*, may be ſqueezed from it.—If the reſiduum, after this fluid is ſeparated, be waſhed in boiling water, it is found to poſſeſs all the properties of coagulated albumen. The ſerum alſo contains gelatine, for if mixed with ſix times its weight of water, and boiled to coagulate the albumen, gelatine remains in the liquor, which may be obtained by concentration, and ſetting it to cool. Prouſt aſcertained that it contains ſulphur, combined with ammonia in the ſtate of hydroſulphuret. Beſides albumen, gelatine, hydroſulphuret of ammonia, it alſo contains ſoda in a cauſtic ſtate, apparently combined with gelatine and albumen; muriate of ſoda, phoſphate of ſoda, and phoſphate of lime.

(2550.) *Cruor*, or the *clot* as it is often called, is of a red colour and conſiderable conſiſtence. If thrown upon a ſearce, and waſhed with a ſmall jet of water falling upon it, the colouring matter is carried through, and there remains upon the ſearce a white elaſtic ſubſtance which has all the properties of *fibrin*. What paſſes through the ſearce is of a red colour, and if ſlowly evaporated to dryneſs, is found to conſiſt of albumen and iron, part of which may be ſeparated from it by the magnet. Neither the ſerum nor fibrin have been found to contain any iron. Fourcroy and Vauquelin have proved that the iron exiſts in the blood in the ſtate of *ſub-phoſphate of iron*.

(2551.) When new drawn blood is well ſtirred with a ſtick, the fibrin collects upon it, and may thus be removed. What remains no longer coagulates unleſs expoſed to heat and is uſed for making puddings, clarifying ſugar, ſalt, &c. When blood is ſlowly evaporated to dryneſs, and then ſubjected to deſtructive diſtillation, new compounds are formed which did not previouſly exiſt; and this takes place with regard to many animal and vegetable ſubſtances. The pruſſic acid, deſcribed under the title of acids, ſeems evidently to be a product of combuſtion. Though our knowledge of blood be very limited, the following ingredients have been detected in its compoſition.

1. Water
2. Fibrin
3. Albumen
4. Gelatine
5. Hydroſupt. of ammonia
6. Soda
7. Sub-phoſphate of iron
8. Muriate of ſoda
9. Phoſphate of ſoda
10. Phoſphate of lime
11. Benzoic acid detected by Prouſt.

(2552.) When blood is drawn from a perſon labouring under inflammation, it ſoon is covered by a white cruſt which phyſicians diſtinguiſh by the name of *buffy coat*. This cruſt was aſcertained by Deyeux and Parmentier to conſiſt of the fibrin. The cruor deprived of this ſubſtance is ſofter than uſual, and is almoſt wholly ſoluble in water. The albumen does not coagulate when heated, though it becomes milky when hot water is poured into the ſerum. The blood varies in its qualities in perſons labouring under different diſeaſes; and ſometimes the diſeaſed cannot be diſtinguiſhed from healthy blood. It is probable that every diſeaſe is accompanied with ſome change in the conſtitution of the blood; but phyſicians are ſeldom chemiſts, and though they were, they have ſeldom time to aſcertain the minute variations which take place in the ſtate of the blood drawn from their patients.—In *Diabetes*, which is accompanied with an exceſſive diſcharge of urine, containing ſugar, the ſerum of the blood aſſumes the appearance of whey, according to Drs Dobſon and Rollo, and ſeems to contain a proportion of ſugar.

Sect. V. Secretions.

I. Milk.

(2553.) Milk is ſecreted from the blood by that claſs of animals which has obtained the name of *mammalia*, and is intended for the nouriſhment of their offspring. The milk chiefly uſed by man as an article of food is that of the *cow*. It is a white opaque fluid, of an agreeable ſweetiſh taſte, and reddens vegetable blues. It is heavier than water, and lighter than blood; but its ſpecific gravity varies at different times. It boils nearly at the ſame temperature with water.

(2554.) When allowed to remain ſome time at reſt, it throws up a yellowiſh coloured ſubſtance to its ſurface, known by the name of *cream*. The remaining milk is much thinner than it was before, and is of a bluiſh white colour. If it be heated to 100°, and have a little *rennet*, formed by digeſting water on the inner coat of a calf's ſtomach, and preſerved with ſalt, well mixed with it, the milk coagulates. It alſo coagulates when treated with alcohol, with acids, with infuſion of the flowers of artichoke and of the thiſtle, and a variety of other plants. It alſo coagulates if as much of any neutral ſalt as it can diſſolve be added to it while boiling; or gum arabic, or ſugar. If the coagulum be broken it ſoon ſeparates into a white ſolid part called *curd*, and a greeniſh liquid part called *whey*.—Thus milk may be ſeparated into three parts, *cream*, *curd*, and *whey*.

(2555.) *Cream* is of a yellow colour, and gradually becomes thick by expoſure to the atmoſphere. If placed in a veſſel of no great depth, it ſoon becomes ſolid; mucors and byſſi form upon its ſurface, and it no longer retains the properties of cream, but of a very fat cheeſe. In this way *cream cheeſes* are made in this country. Thus cream contains a peculiar oil curd, and ſome ſerum. The oil is ſeparated from it by the proceſs of churning, which divides cream into two parts, the one ſolid called *butter*, the other fluid, which reſembles creamed milk.

(2556.) Butter is of a yellow colour, melts at 96° and becomes tranſparent. If kept melted ſome time it depoſits curd and whey, and aſſumes the appearance of an oil, but loſes its peculiar flavour. If kept ſome time it becomes rancid; but if it be well waſhed, and ſufficiently purged of theſe foreign ingredients, it remains ſweet much longer than when this precaution is not adopted. Diſtilled it yields water, an acid, an oil at firſt fluid and afterwards concrete. A ſmall quantity of charcoal remains in the retort.

(2557.) When cream is churned it is commonly kept ſome time until it becomes ſour. Freſh cream requires at leaſt four times as much churning to make it yield butter, as ſour cream does. Milk warm from the cow yields more butter than can be obtained from the cream it throws up; but it requires proportionally more churning than the cream, eſpecially if the latter be previouſly ſoured. When very ſour cream is churned, the butter milk that is left is not nearly ſo ſour as the cream had been; though the butter remains perfectly ſweet. This ſhews that the acid which had been formed in the cream is partly decompoſed during the churning. Young and Thenard have ſhewn that ſour cream may be churned, and butter obtained, although atmoſpheric air be excluded. But in the *Agricultural Survey of Mid-Lothian*, an experiment on churning is recorded which was conducted by Meſſrs Robertſon and Headrick. They operated on milk freſh drawn from the cow; and it appeared that atmoſpheric air conſtantly entered into, and combined with the milk during the whole proceſs. The butter was perfectly ſweet, and the milk acquired that degree of acidity which diſtinguiſhes new churned milk. We are therefore inclined to think that the oil in milk, like other vegetable oils, is originally in a liquid ſtate; but that it conſolidates into butter in conſequence of abſorbing oxygen, either from an acid previouſly formed in the cream, or formed by agitating the liquid in contact with air during the proceſs of churning. Carbonic acid gas is ſometimes extricated during churning, and the temperature generally increaſes about four degrees.—Butter may be churned from whey after the curd is extracted from it; and 27 Scotch pints yields about a pound of butter. Mr Johnſon of Hillhouſe near Edinburgh gradually heats his whey to about 150°, when it throws up its cream. This being ſkimmed off, is churned into butter.

(2558.) *Curd* may be ſeparated from creamed milk, or from butter milk, by the addition of rennet. It is white and ſolid, and poſſeſſes many of the properties of coagulated albumen. When the moiſture is ſqueezed out, it becomes hard and brittle. It is inſoluble in water, but readily combines with pure alkalies, eſpecially when aſſiſted by heat. With fixed alkalies much ammonia is evolved, and if the heat be ſtrong charcoal is depoſited. When precipitated by an acid, it is of a black colour, melts like tallow, and never acquires the conſiſtence of curd. Hence alkalies appear to decompoſe curd, and to convert it into ammonia and oil, or rather fat. The mineral acids, when much diluted, diſſolve freſh undried curd, when aſſiſted by heat. The vegetable acids only diſſolve it when they are concentrated.

(2559.) Curd is the baſis of cheeſe, and the beſt cheeſe is that from which as little as poſſible of the cream is abſtracted. For this reaſon it ſhould be ſubjected to as little preſſure as poſſible in abſtracting the whey. For this purpoſe it is firſt cut in various directions with a wooden knife, and the whey which ſpontaneouſly ſeparates is laved off. When the curd has acquired a firm conſiſtence, it is repeatedly cut into ſmall fragments by a four-edged knife, and thrown upon a drainer. It is then repeatedly cut in the ſame manner, and ſubjected to a gentle preſſure in the cheſlet. By this proceſs the oil in the curd attracts oxygen, and is converted into butter, which remains in union with the curd. The laſt portions of the whey are expelled by ſubjecting the cheeſe to violent preſſure. If the ſoft curd be ſubjected to violent preſſure, much of the cream goes off with the whey. Cheeſe of this ſort melts when expoſed to heat; but cheeſe from ſkimmed milk, or from butter milk, dries and ſhrivels up like horn. Much of the cream is alſo expelled by overheating the milk before the rennet is applied. The heat ſhould not exceed 100°.

(2560.) *Whey* contains a portion of curd, which may be ſeparated by filtration, or by boiling. In the latter caſe the curd riſes and forms a thick ſcum on the ſurface, which may be ſkimmed off, and is called in Scotland *float whey*. Freſh whey is of a yellowiſh green colour, and of an agreeable ſweet taſte. But after the curd is carefully ſkimmed, and is allowed to ſettle ſome hours, it may be decanted off colourleſs like water. If this liquid be ſlowly evaporated, it depoſits at laſt white cryſtals, which are ſugar of milk. Whey alſo contains acetic acid, and hence reddens vegetable blues. It alſo contains ſome muriate of potaſh and of ſoda. Fourcroy and Vauquelin diſcovered in it ſome phoſphate of magneſia and of iron, ſulphate of potaſh, and a peculiar extractive matter.

(2561.) Milk is capable of undergoing the vinous fermentation ſpontaneouſly, and then yields alcohol by diſtillation. Before this takes place it muſt previouſly become ſour, and then be placed in the proper temperature. In this way the Tartars obtain a vinous liquor from mare's milk, to which they give the name of *koumiſs*. The people in Orkney and Shetland prepare a vinous liquor from cow's milk by a proceſs nearly ſimilar.

(2562.) When milk is diſtilled there comes over firſt water containing animal matter which ſoon putrifies. After being concentrated the milk coagulates, like albumen, into a thick unctuous yellowiſh-white ſubſtance. By increaſing the heat this ſubſtance yields a tranſparent liquid, which becomes gradually coloured; ſome very fluid oil, then ammonia, an acid, and laſtly a very thick black oil. At the ſame time carbureted hydrogen gas is emitted. There remains a coal which contains carbonate and muriate of potaſh, phoſphate of lime; and ſometimes magneſia, iron, and muriate of ſoda.—Cows milk therefore contains

1. Water
2. Oil
3. Curd
4. Extractive
5. Sugar of milk
6. Acetic acid
7. Muriate of ſoda
8. Muriate of potaſh
9. Sulphate of potaſh
10. Phoſphate of lime
11. Phoſphate of magneſia
12. Phoſphate of iron.

(2563.) Women's milk contains much more ſugar than cows milk. It throws up abundance of white cream, and when this is ſeparated, it becomes very thin, and of a bluiſh white colour. Women's milk has not been coagulated except by boiling; nor can the cream be formed into butter by churning.—Aſſes' milk very much reſembles women's milk.—Goats milk differs little from cow's milk, except in containing leſs cream and more curd. It derives a peculiar flavour from the wild herbs on which the animals feed.—Ewe's milk is thicker than cows milk, and makes a pungent ſpecies of cheeſe.—Mare's milk is thicker than women's milk, and contains more curd, but not ſo much as the milk of the cow.—All theſe milks contain nearly the ſame ingredients; though their proportions vary conſiderably; and thoſe of cows milk vary with their food, and at different ſeaſons of the year.

XI. EGGS.

(2564.) Theſe conſiſt of an outer ſhell, the properties of which were conſidered under animal ſolids; of an interior membrane, which probably conſiſts chiefly of coagulated albumen. Within this are included two liquids, the *white* and the *yolk*.

(2565.) The white of eggs is often uſed as a varniſh and cement, and to clarify turbid liquors. According to Dr Boſtock it is compoſed of

Water	80·0
Albumen	15·5
Mucus	4·5
	100·0

The yolk, as well as the white, conſolidates when boiled. According to Chandelier, it contains

1. Water
2. Yellow fixed oil, or fat
3. Albumen
4. Gelatine.

XII. SALIVA.

(2566.) This is a frothy fluid ſecreted from glands ſituated in the throat and mouth, eſpecially while we are employed in eating. When allowed to ſettle it becomes limpid as water; but again froths when agitated with air. It does not readily combine with oil or water; but mixes with the latter ſo as to paſs through a filter when they are triturated in a mortar. It abſorbs oxygen from the air, and gives it out again to other bodies. Hence gold and ſilver are oxygenated when triturated with ſaliva, and the killing of mercury by oils is facilitated by ſpitting into the compound. To this is imputed the effect of ſaliva in curing ſores, as dogs and other animals have recourſe to licking their ſores, with great ſucceſs. From a parable in the New Teſtament it is inferred that this mode of cure prevailed in Aſia, and that ſeveral human ſores might be eaſily cured by employing dogs to lick them.—By evaporation, and diſtillation, human ſaliva yields the following products,

1. Mucus, or mucilage, about one half of its ſolid contents,
2. Albumen,
3. Muriate of ſoda,
4. Phoſphate of ſoda,
5. Phoſphate of lime,
6. Phoſphate of ammonia.

But the products vary, eſpecially from diſeaſe. Brugnatelli found the ſaliva of a patient labouring under an obſtinate venerial diſeaſe, to abound in oxalic acid.—The ſaliva is reckoned not to differ materially from the *gaſtric*, or *pancreatic* juice; though the latter has never been obtained in purity, ſo as to admid of compariſon.—Dogs do not emit ſweat from their ſkins, and this ſecretion goes off in ſaliva. To the ſaliva of a dog, when diſeaſed, is imputed its effect in producing the canine madneſs; a diſeaſe hitherto incurable, unleſs its yielding to the Galvanic fluid be verified. There is yet no analyſis of the ſaliva of dogs, and we do not know what conſtitutes its healthy or diſeaſed ſtate. It ſeems to be aſcertained that any carnivorous animal, in which man is included, which bites while in a ſtate of violent rage, approaching to frenzy, *may* chance to communicate the canine diſeaſe to the patient on whom he operates.—How does rage ſuddenly change ſaliva, previouſly harmleſs or ſalutary, into a deadly poiſon.—This queſtion we cannot anſwer.

XIII. Bile

(2567.) Is ſecreted by the glandular ſubſtance called the liver, and is collected in a reſervoir, until needed for uſe, called the *gall bladder*. The ancient phyſicians paid much attention to the bile juice, imputing to its ſanity or the reverſe, the health or diſeaſes which afflict the human kind. The poets, who embalm and perpetuate all the nonſenſe which prevails in their times, aſcribed to it a domineering influence on the intellectual vigour the temper and diſpoſitions of the mind.—The bile with which we are beſt acquainted is ox-bile. It is of a yellowiſh green colour, bitter taſte, and peculiar ſmell. When violently ſtirred it lathers like ſoap, and hence has been called *animal ſoap*. It combines with water in any proportion, but not with oil; though it readily combines with ſoap, and is uſed by fullers to take greaſy ſtains out of cloth.—The beſt analyſis of bile with which we are furniſhed is that of Thenard, who in 800 parts of bile found the following products.

Water	700
Reſin	43
Saccharine matter	41
Albumen	4
Soda	4
Muriate of Soda	3·2
Sulphate of ſoda	0·8
Phoſphate of ſoda	2·0
Phoſphate of lime	1·2
Oxide of iron	0·5
	799·7

XIV. Cerumen of the Ear.

(2568.) This is a yellow-coloured liquid ſecreted from glands in the auditory canal, which gradually hardens by expoſure to the air. Its object is to guard againſt inſects, which would ſoon deſtroy the *tympanum* or *drum of the ear*. Whether it acts as a poiſon to inſects is not aſcertained; but it is certain that no inſect likes to approach it if the contact can be avoided.—Vauquelin, from his own experiments and thoſe of others on this ſubſtance, concludes that it conſiſts of

1. Albumen,
2. An inſpiſſated oil,
3. A colouring matter,
4. Soda,
5. Phoſphate of lime.

XV. Tears and Mucus.

(2569.) Tears are intended to lubricate the eye, and to waſh away particles of duſt, and other matters which would ſoon obſtruct viſion, or excite excrutiating pain in the eye. Tears flow copiouſly from the eye, when the mind is agitated by grief, or even by exceſs of joy.—Tears are tranſparent and colourleſs like water, but always exhibit a ſalt taſte. Expoſed to the air, this liquid becomes thicker and at laſt depoſits cubical cryſtals in the midſt of mucilage.—Fourcroy and Vauquelin, to whom we are indebted for any experiments yet made on tears, found them compoſed of

1. Water,
2. Mucus,
3. Muriate of ſoda,
4. Soda,
5. Phoſphate of lime,
6. Phoſphate of ſoda,

The ſaline parts ſcarcely amount to one *per cent.* of the whole. The *mucus* abſorbs oxygen from the atmoſphere, becomes thick and viſcid, and aſſumes a yellow colour. It then becomes inſoluble in water, though freſh tears are miſcible with water in any proportion. Oxymuriatic acid ſuddenly produces this effect upon freſh tears, by imparting oxygen to the mucilage. The *mucus* of the noſe is of the ſame properties with that which drops from the eyes, though, being longer ſuſpended, and expoſed to the air, it acquires greater conſiſtency. Indeed the mucus of the eyes paſſes into the noſtrils by particular apertures, which being obſtructed the eyes become diſeaſed.—The mucus which lubricates various other parts of the body, has not been examined; but is ſuppoſed to be ſimilar to that which lubricates, and drops from the eyes.

XVI. Liquor of the Pericardium.

(2570.) This liquor is encloſed in a membrane which inveſts the heart, and is intended to lubricate this organ, and to prevent the dangerous conſequences of friction. Dr Boſtock examined this liquor taken from a boy who died ſuddenly. It very much reſembled the ſerum of blood, and was compoſed of

Water	92·0
Albumen	5·5
Mucus	2·0
Muriate of ſoda	0·5
	100·0

XVII. Humours of the Eye.

(2571.) There are three humours which compoſe the lens by which viſion is affected; and their different degrees of refracting power correct each other, and prevent the aberration of the rays of light. Theſe humours are included within the cornea, and have obtained the names of the *aqueous*, the *cryſtalline*, and the *vitreous* humour. The vitreous is the interior humour, and is by far the largeſt in proportion. Mr Chenevix examined the eyes of ſheep, and found their aqueous and vitreous humours not to differ ſenſibly in their compoſition, except that the latter was rather of more ſpecific gravity than the former. He found them to conſiſt of

1. Water,
2. Albumen,
3. Gela-

3. Gelatine,
4. Muriate of ſoda.

Nicholas alſo detected a little phoſphate of lime.—The cryſtalline humour, or lens, is ſolid and tranſparent, and is compoſed of concentric coats, the denſeſt of which are next the center. It is compoſed of albumen and gelatine united with water, and the quantity of gelatine, according to Nicholas, diminiſhes as we approach the center of the lens. It is nearly ſoluble in water, but coagulates in hot water. The humours of the human eye, of thoſe of oxen, and of birds, do not differ ſenſibly from thoſe of ſheep, except in poſſeſſing a ſmall degree of more ſpecific gravity.

XVIII. Sinovia.

(2572.) This liquid is ſecreted between the moving joints of animals, and is evidently intended to lubricate the parts, and to prevent friction. Mr Margueron examined ſinovia taken from the joints of the lower extremities of oxen. When freſh from the joint it is a viſcid, greeniſh coloured, ſemitranſparent fluid, having a ſmell not unlike that of frog ſpawn. It ſoon acquires the conſiſtence of jelly, but afterwards recovers its fluidity, and depoſits a thready like matter. It combines with water and renders it viſcid. Alcohol precipitates from it albumen, and acids precipitate a fibrous matter, which has the ſmell, colour, taſte and elaſticity of vegetable gluten. When diſtilled there firſt comes over water which ſoon putrifies; then water containing ammonia; then empyreumatic oil and carbonate of ammonia. The coal contains muriate and carbonate of ſoda, and ſome phoſphate of ammonia.—From Mr Margueron's analyſis it appears that the ſinovia of the ox is compoſed of

11·86 fibrous matter,
4·52 albumen,
1·75 muriate of ſoda,
·71 ſoda,
·70 phoſphate of lime,
80·46 water.

100·00

XIX. Semen.

(2573.) This liquid is ſecreted in the teſtes of males, and is intended for the impregnation of females. No other ſemen but the human has yet been examined, and of this Vauquelin publiſhed an analyſis in 1791.—When newly emitted, it conſiſts of two ſubſtances, one fluid and milky ſuppoſed to be ſecreted by the proſtate gland; the other thick and mucilaginous, in which numerous ſhining filaments may be diſcovered, is ſuppoſed to be ſecreted by the teſtes. It has a diſagreeable ſmell, an acrid irritating taſte, and a greater ſpecific gravity than water. Rubbed in a mortar it becomes frothy. It converts paper ſtained with the bloſſoms of mallows or violets to a green colour, and hence contains an alkali. After ſome time the whole becomes perfectly liquid and then it readily diſſolves in water, which does not take place when newly emitted. It readily combines with acids and alkalies. When expoſed to the air at the temperature of 60°, it aſſumes a tranſparent pellicle, and depoſites ſmall tranſparent cryſtals of phoſphate of lime. If kept in very moiſt air at 77° it acquires the colour of the yolk of an egg; its taſte becomes acid, it exhales the odour of putrid fiſh, and its ſurface is covered by the *byſſus ſeptica*.—According to Mr Vauquelin, ſemen is compoſed of

90 water,
6 mucilage,
3 phoſphate of lime,
1 ſoda.

100

XX. Liquor of the Amnios.

(2574.) The amnios is a membrane which envelopes the fœtus in the uterus, and it is filled with a liquor in which the fœtus is immerſed. Only the *liquor amnii* of women and of cows have yet been examined by Vauquelin and Buniva; and it is probable this liquor varies in its properties in different animals. In the amnios of women this liquor is of a weak but pleaſant odour, of a ſaltiſh taſte, and of a ſlightly milky colour owing to a curdy matter ſuſpended in it, which may be ſeparated by filtration. It changes tincture of violets to green, and tincture of turnſole to red, which ſeem to indicate the preſence both of an alkali and an acid, though we cannot conceive how they could co-exiſt without combining. It froths when agitated, becomes opaque when heated, and emits the ſmell of boiled white of egg. Acids render it more tranſparent. Alkalis and alcohol produce flaky precipitates; the latter being dried becomes tranſparent, and much reſembles glue. Infuſion of nut-galls produces a copious brown precipitate. When ſlowly evaporated it becomes ſlightly milky, and leaves a reſiduum not exceeding 0·012 of the whole. Thus the liquor in women's amnios has been found to conſiſt of

98·8 water

$$1{\cdot}2\left\{\begin{array}{l}\text{albumen}\\ \text{muriate of ſoda, ſoda}\\ \text{phoſphate of lime, lime.}\end{array}\right.$$

100·0

(2575.) The curdy matter ſuſpended in this liquor is often found depoſited upon the ſkin of the fœtus, and is ſuppoſed by Vauquelin and Buniva to be formed from the albumen of that liquid which has undergone ſome unknown changes. It has a ſtrong reſemblance to fat.

(2576.) The liquor in the amnios of the cow is of a browniſh red colour, a bitter and acid taſte, a viſcidity ſimilar to gum arabic, and a peculiar ſmell. It reddens tincture of turnſole, and hence contains an acid. Muriate of barytes ſeparates from it ſulphuric acid. Alcohol ſeparates a reddiſh coloured matter. By evaporating the liquor to a fourth part of its bulk, and allowing it to cool, it depoſits cryſtals of amniotic acid. Thus the liquor of the amnios of cows contains

1. Water
2. A peculiar animal matter, ſuppoſed a ſpecies of mucilage.
3. Amniotic acid
4. Sulphate of ſoda.

XXI. Animal Poisons.

(2577.) For any thing that is known concerning theſe liquids we are indebted to Fontana. When poured into a freſh wound they occaſion the diſeaſe or death of an animal. Theſe poiſonous juices are elabourated by ſerpents, bees, waſps, ſcorpions, ſpiders, &c. It ſeems now to be agreed among naturaliſts that the toad is not a poiſonous reptile, and that he has been indebted for this unfavourable opinion to his diſguſting appearance alone. Yet dogs who have incautiouſly bitten toads, have been known to ſwell very much, and to labour under great pain. Little progreſs has yet been made in inveſtigating the properties of animal poiſons. The inveſtigation is attended with extreme difficulty; but could it be fully accompliſhed it would ſuggeſt an antidote againſt their deleterious effects.

(2578.) The poiſon of the viper is a yellow liquid lodged in two ſmall veſicles in the animal's mouth. When it bites, the veſicles are compreſſed and the poiſon is forced through a tube into the wound by the crooked fangs. If the viſicles or the fangs be extracted, the bite is harmleſs. If the poiſon be inſerted into a wound by ſharp inſtruments, it proves equally fatal as when it is inſerted by the animal itſelf. The quantity in a ſingle veſicle ſcarcely exceeds a drop; and Fontana having collected the poiſon of many hundred vipers, found it had no taſte, but conveyed numbneſs to the tongue. It has the appearance of oil before the microſcope, though it combines with water. It does not alter vegetable blues; hence ſeems to contain no uncombined acid. Expoſed to the air, its water evaporates; and Fontana could not diſtinguiſh between the reſiduum and gum arabic. Both are of the ſame colour and taſte; both are equally ſoluble in water; but whether the venom ſtill retains its poiſonous property, after being evaporated into a gum, and again diſſolved in water, has not been aſcertained.—Indeed the ſimple act of taſting could be of no uſe in deciding ſuch a queſtion, becauſe there have been men who ſwallowed wine glaſſes nearly full of the venom freſh drawn from vipers and rattle-ſnakes. They found it an exhilarating ſort of juice, and to produce the ſame effects upon them as a dram of brandy; or rather a doſe of opium. Had there been any ruptured blood veſſels in their gums, mouth, throat, or inteſtines the experiment would have proved immediately fatal.

(2579.) Dr Ruſſel, from his experiments, thinks that the poiſon of all other ſerpents is preciſely the ſame with that of the viper. This ſeems to be an erroneous opinion, for it is known that the effect of the bite of ſerpents in this country, taking a general average, depends upon the ſize and ſtrength of the ſerpent which inflicts the wound, compared with the ſize and ſtrength of the animal upon whom the wound is inflicted. Againſt this general rule there are many exceptions, for it is well kown that there are ſeveral ſpecies of ſerpents in this country, which never attain a large ſize, but which inflict a more fatal wound than others of more than three times their length, and more than ten times their weight. The *cobra di capello* is a ſerpent which abounds in India. Its length varies from the ſize of a man's little finger, to from ten to thirteen inches. When this ſerpent bites, the death of the animal bitten is certain, according to the ſize of the animal bitten; unleſs remedies are uſed. The bite of this ſerpent does not depend upon the correlative ſize of its body and that of the animal bitten. Its bite, unleſs remedies are applied, always effects, ſooner or later, the deſtruction of the animal bitten. From theſe facts we are inclined to think that animal poiſons are far from being yet underſtood; and that there is a difference in the compoſition, as there is an aſcertained difference in the effect of the venom of ſerpents.

(2580.) Dr Mead imagined the poiſon of ſerpents to conſiſt of acids; and therefore recommended ammonia, or vol. alkali, as a certain cure. But we have ſeen that it exhibits no acid properties; and the numerous ineffectual trials of Fontana robbed this application of all its celebrity. Dr Ramſay has lately attempted to revive its credit as a cure for the bite of the rattle-ſnake. Others having obſerved that ſwine eat ſerpents, and ſeem not to be affected by their bite, have concluded that the greaſe with which theſe animals are inveſted operated as an antidote againſt the poiſon. They have hence recommended hog's lard, or ſweet oil, as an infallible remedy. When the late Duke of Hamilton went to enjoy his favourite amuſement of fowling in Arran, where ſerpents abound, he always carried a bottle of olive or caſtor oil in his pocket. But he always walked with leather leggings, and never had occaſion to uſe his oil. It appears that theſe applications can have no other effect than waſhing part of the venom out of the wound, before it enters the blood veſſels. The reaſon why ſwine do not ſeem to be hurt by the bite of ſerpents, is that the fat with which they are inveſted prevents the venom from entering their blood-veſſels. In man and other animals, the effect depends much upon the part of the body where the poiſon is inſerted. Thus the bite a of viper ſeldom proves fatal to a ſheep upon its leg; but if the animal ſhould lie down upon a ſerpent and be bitten in the udder, or genitals, it always dies in conſequence. If a man ſhould incautiouſly ſwallow a waſp, and be ſtung by it in the throat, it proves fatal. Perſons who have been bitten by ſerpents, tho' it did not prove fatal, have aſſured us that they always experienced a numbneſs and debility in the limb that had been bitten. As chemiſtry does not furniſh us any certain knowledge of the properties of animal poiſons the only antidote that appears infallible is an immediate exciſion of the part, and preventing the venom from entering into the circulation of the blood.

XXII. Urine.

(2581.) This has attracted more of the attention of phyſicians than almoſt any other animal fluid. They imagined it to be an infallible index of the health or diſeaſe of the perſon by whom it was voided. The alchymiſts believing it to be a *microcom*, or concentrated eſſence of matter, laboured to extract from it their grand elixir, or philoſopher's ſtone. It was by following out ſuch projects that phoſphorus was firſt diſcovered.

(2582.) Healthy urine, when freſh, is generally tranſparent, of a light amber colour, emits a ſmell reſembling that of violets, and has a diſagreeable taſte. When it cools its ſmell is that which is termed *urinous*; and in a few days it emits a fetid

tid alkaline ſmell. Lime water precipitates from freſh urine phoſpate of lime. Hence this ſalt in urine contains an exceſs of acid; and this is the reaſon why freſh urine reddens turnſole, and paper ſtained with the juice of raddiſhes. The ſuper-phoſphate of lime abounds moſt in the urine of ſick and of gouty perſons. There is alſo preſent in urine a little of the phoſphate of magneſia. Prouſt obſerved that urine contains ſome carbonate of lime, and its preſence ſeems inconſiſtent with that of ſuper-phoſphate of lime. Urine generally when it cools, and always after it has been reduced by evaporation, depoſits a brick coloured precipitate, which is *uric acid* in cryſtals. During intermittent fevers, and diſeaſes of the liver, a brick red ſediment is depoſited from urine, which is the roſaſic acid of Prouſt. If urine, eſpecially that of horſes and cows, be evaporated to the conſiſtence of a ſyrup, and have muriatic acid poured into it, a depoſition takes place of benzoic acid. Infuſion of tannin precipitates from diſeaſed urine gelatine or albumen. The ſmaller the quantity of this precipitate the more healthy the patient; and *vice verſa*. If urine be evaporated to a thick ſyrup, it conſolidates on drying. Alcohol poured upon this maſs diſſolves *urea*, and being decanted off, and ſlowly diſtilled, the urea is obtained in a cryſtallized form. It is to urea that urine owes its peculiar properties. Prouſt alſo detected a ſmall quantity of bile in urine. Urine likewiſe contains muriate of ſoda, and the *fuſible ſalt of urine*, or *microcoſmic ſalt*. It frequently alſo contains muriate of ammonia. Theſe latter ſalts have the form of their cryſtals altered in conſequence of holding urea in their compoſition. But the properties of theſe ſalts, and of urea, having been already illuſtrated, it ſeems unneceſſary to recapitulate what was already ſtated. A ſilver baſon is blackened if urine be boiled in it, and therefore it contains ſulphur. When the urine putrifies, the ſulphur eſcapes with carbonic acid, and blackens paper ſtained with acetate of lead, when expoſed to its fumes. Healthy urine therefore contains the following ingredients. Though their portions vary from circumſtances, and often ſome of theſe ingredients cannot be detected.

1. Water
2. Phoſphoric acid
3. Phoſphate of lime
4. Phoſphate of magneſia
5. Carbonic acid
6. Carbonate of lime
7. Uric acid
8. Roſacic acid
9. Benzoic acid
10. Gelatine and albumen
11. Urea.
12. Reſin of bile
13. Muriate of ſoda
14. Phoſphate of ſoda
15. Phoſphate of ammon.
16. Muriate of ammonia
17. Sulphur.

(2583.) Several other ſalts have been occaſionally detected in urine. No ſubſtance putrifies more rapidly then urine, or exhales a more deteſtable ſmell during putrefaction. Healthy urine often remains ſeveral days without putrefying; but diſeaſed urine frequently putrefies the moment it is voided. This is ſuppoſed owing to the great proportion of albumen and gelatine it contains, which acting on the urea, new products are produced. Ammonia is produced, which ſaturates the phoſphoric, uric, and benzoic acid; while part of the gelatine is precipitated in the form of white flakes, and the phoſphates of lime and of magneſia form cryſtals on the ſides of the veſſel. The diſtillation of urine produces nearly the ſame changes as are effected by its putrefaction, and from both are obtained

1. Ammonia
2. Carbonate of ammonia
3. Phoſphate of ammonia
4. Phoſphate of magneſia and ammonia
5. Urate of ammonia
6, Acetate of ammonia
7. Benzoate of ammon.
8. Muriate of ſoda
9. Muriate of ammonia

(2584.) Conſiderable differences take place in colour and ingredients of urine from various diſeaſes, which have been more the objects of attention with phyſicians than with chemiſts.—The urines of various animals differ from each other, and from that of man. In general the urine of graminivorous quadrupeds has been found to agree with that of men, in containing urea; but differs from it in being deſtitute of phoſphoric acid, the phoſphates, and uric acid. The urine of carnivorous quadrupeds has not been examined.

XXIII. FECES.

(2585.) Theſe are voided *per anum* by animals, after all the uſeful materials of their food are extracted, and ſent into circulation for the nouriſhment of their bodies. They conſiſt of the indigeſtible parts of the food, mixed with various liquids which are diſcharged upon them during their paſſage through the inteſtines.—What is known concerning feces we owe to Vauquelin and Berzelius, to Thaer and Einhof, who made experiments upon them with a view to aſcertain the changes produced on food by digeſtion, or the cauſe of the fertility produced by feces when applied as a manure.

(2586.) Freſh human feces do not alter vegetable colours, and hence contain no uncombined acid nor alkali. Their taſte is ſweetiſh bitter; their ſmell is known to every one. Their conſiſtency varies, and they loſe about $\frac{3}{4}$ths of their weight, when dried on a water bath. They may be diffuſed by agitation and maceration in water, and the liquid, being paſſed through a linen cloth, leaves a greyiſh brown matter, of a peculiar ſmell, which adheres long to the cloth. When dried, this ſubſtance amounts to about 7 *per cent.* of the feces, and it exhibits remains of the vegetable, and perhaps animal matters uſed as food.

(2587.) The liquid which paſſes through the cloth, depoſits, after ſtanding, a yellowiſh green matter, which may be ſeparated by the filter. When dry, it amounts to about 14 *per cent.* of the feces. Alcohol ſeparates from it a ſubſtance reſembling the reſin of bile. When this is removed, water diſſolves a yellow ſubſtance, which ſeems to conſiſt of mucus, with perhaps a little gelatine. Tannin makes it muddy, but forms no precipitate. This ſubſtance ſoon putrifies, and emits the ſmell of putrid urine. There remains a greeniſh gray ſubſtance, inſoluble in water and alcohol, which, when burnt, leaves ſome ſilica and phoſphate of potaſh.—The liquor which paſſes through the filter, is at firſt yellow, but becomes brown and muddy by expoſure to the air. It was found to contain albumen, mixed with phoſphoric ſalts. Bile, or rather the reſin of bile combined with ſoda. A peculiar ſubſtance of a reddiſh brown colour, ſoluble both in water and alcohol; to which acids give an intenſe brown colour. A ſmall quantity of tannin throws it down in the form of a red powder; but a large quantity in greyiſh brown flakes. The liquor alſo contained various ſalts, of which *ammonio-phoſphate* of magneſia is the principal.—Human feces then, according to Berzelius conſiſt of the following ingredients:—

Water,	73·3
Vegetable and animal remains,	7·0
Bile,	0·9
Albumen,	0·9
Peculiar extractive matter,	2·7
Salts,	1·2
Slimy matter; conſiſting of reſin of bile, peculiar animal matter, and inſoluble reſidue,	14·0
	100·0

(2588.) Thaer and Einhof operated on the dung of oxen that were fed on turnips. It pu- refied readily, and changed the oxygen of the air nto carbonic acid, as takes place in the putrefac- ion of vegetables. When freſh, and dried on a team bath, 100 parts leave 28⅛ of ſolid matter. Eight ounces diffuſed through water, let fall 45 grains of ſand. The liquid, on ſtanding, depoſited a ſlimy ſubſtance, which was ſeparated by the fil- er, and weighed, when dry, 480 grains. It was of the peculiar colour and ſmell of the feces, and was conſidered by Einhof as the remains of vege- able matter uſed as food by the cattle. It pro- ably contained alſo ſome reſin of bile. The fil- ered ſolution was at firſt colourleſs, but ſoon became yellow, and then brown. Evaporated to dryneſs it left a browniſh matter of a bitteriſh aſte, weighing 90 grains, which was ſoluble in water, but not in alcohol. It ſoon putrefied, ex- haling ammonia, and burnt like animal matter. It ontained ſome phoſphoric ſalts.—When freſh ows dung was dried and burnt, it left an aſh ompoſed of the following earths and ſalts, and in he following proportions:—

Lime,	12
Phoſphate of lime,	12·5
Magneſia,	2
Iron,	5
Alumina and ſome magneſia,	14
Silica,	52
Muriate and ſulphate of potaſh,	1·2

(2589.) Vauquelin having calculated the amount f fixed matters taken in by hens as food, and aving aſcertained the amount of fixed matters iven out by eggs and excrement, during the ſame eriod, found the fixed matters given out conſi- erably to exceed the fixed matters taken in to heir ſtomachs. The fixed parts taken in to their tomachs. The fixed parts taken in by a hen in en days while ſhe was fed on oats, amounted to 56·057 grains, conſiſting of phoſphate of lime and lica. But during that time ſhe gave out 971·482 rains, conſiſting of phoſphate and carbonate of me and ſilica, making the ſurplus given out 15·425 grains above what was taken in. Of this urplus 511·911 conſiſted of carbonate of lime, of hich none was taken in with the food. The uantity of phoſphate of lime given out, exceeded hat taken in by 137·796 grains; but the ſilica iven out was leſs than that taken in by 34·282 grains.—It is poſſible the animal may have picked up carbonate of lime from the plaſter of the room. But if not, and if this experiment be found correct, it will prove that neither phoſphorus, nor lime, nor perhaps any of the earths are ſimple ſubſtances, and that animals have a power of forming them by the proceſs of digeſtion. Indeed this fact ſeems now to be verified by the ſplendid diſcoveries of Mr Davy ſo often alluded to, which have inconteſtably proved that the baſes of the alkalies and alkaline earths are metallic ſubſtances. It ſeems very probable that the baſes of the other earths will alſo be found to be metallic, and that plants and animals have a power of forming them from their principles abſorbed by their roots or ſtomachs, or from the atmoſphere.

SECT. VI. MORBID CONCRETIONS.

(2590.) Such of theſe as have been hitherto obſerved have been divided into

I. OSSIFICATIONS.

(2591.) Of theſe the firſt that occur are *pineal concretions*, which are formed in the pineal gland, ſituated in the centre of the brain. They reſemble particles of ſand, and can hardly be called morbid, becauſe we believe they occur in all adults. 2. *Salivary concretions* are often formed in the ſalivary glands, eſpecially the parotid and ſublingual. 3. *Pancreatic concretions* are often found in the pancreas. 4. *Pulmonary concretions* are often coughed up by perſons labouring under conſumption, and the lungs of ſuch perſons contain many ſimilar bodies. 5. *Hepatic concretions.* Theſe are ſometimes formed in the liver, and are commonly of a more irregular ſhape, and of a much larger ſize than any of the former. 6. *Concretions in the proſtate*, are ſometimes formed in the proſtate gland. 7. The extremities of the muſcles, of the larger blood veſſels, together with the valves of the heart and aorta, often harden and aſſume the appearance of bone. This happens chiefly to aged perſons, and is frequently the cauſe of their death, as it unfits theſe organs for diſcharging their functions.—Anatomiſts, who were alſo excellent chemiſts, have aſſured us that they found the *pineal concretions* to be compoſed of ſilica, and every way ſimilar to common quartz. But Dr Wollaſton found them to conſiſt chiefly of phoſphate of lime. Perhaps their compoſition may vary with the age of the perſon, or they may ſometimes contain a mixture of both theſe ingredients. The gentlemen alluded to, concluded they were ſilicious, becauſe ſuch as they tried ſcratched glaſs, and were inſoluble in every acid they applied.—The other concretions which have been examined have been found to conſiſt chiefly of phoſphate of lime, and tough animal membrane. Sometimes they contain a portion of carbonate of lime; and a pulmonary concretion examined by Mr Crompton, contained no phoſphate, but conſiſted of

Carbonate of lime,	82
Animal matter and water,	18
	100

II. INTESTINAL CONCRETIONS.

(2592.) Theſe, ſometimes of conſiderable ſize,

are

aſionally found in the ſtomach and inteſ-
eldom indeed of man, but more frequently
e of inferior animals. Some of theſe are
bezoars, and their medical virtues were
xtolled, though they ſeem now to have loſt
lebrity. The principal of theſe, as pointed
Fourcroy and Vauquelin, are—1. *Super-*
te of lime, which is arranged in concentric
very brittle, and eaſily ſeparable from each
They are partially ſoluble in water, redden
ble blues, and were found in the inteſtines
rent mammalia.—2. *Phoſphate of magneſia*,
an uncommon concretion, ſemi-tranſparent,
ually of a yellowiſh colour. It is arranged
rs not ſo eaſily ſeparable as the former.—
ſphate of ammonia and magneſia. This is
ſt common of any, is of a grey or brown
, is compoſed of cryſtals diverging like radii
centre, and ſomewhat reſembles ſpar of
It contains much animal matter, and is
ound in the inteſtines of the horſe, the ele-
and other herbivorous animals.—4. *Biliary.*
are ſometimes found in the inteſtines and
ladders of oxen. They are a coagulated
of a reddiſh brown colour. Painters uſe
as an orange yellow pigment, and they do
em to differ much from the reſinous matter
.—5. *Reſinous.* Theſe are the oriental be-
formerly ſo celebrated, and are obtained
animals with which we are unacquainted.
roy and Vauquelin diſtinguiſh two varieties
m. The firſt of a pale green colour, and
o conſiſt of bile and reſin. The ſecond of a
or violet colour, and their compoſition
uncertain. Both are fuſible and combuſti-
ompoſed of concentric layers, ſmooth, ſoft,
nely poliſhed. The firſt is ſoluble in alco-
he ſecond in alkalies.—6. *Hairy.* Theſe con-
balls of hair, which are often of very large
re felted together like a hat, and are found
ſtomachs and inteſtines of various animals.
ſometimes contain a mixture of vegetable
rs, ſometimes are coated with animal matter.
occur frequently in cows, and are thought
occaſioned by the animals licking off their
r each others hair. By obſtructing the paſ-
f the inteſtines, they frequently occaſion the
of the animals.

III. BILIARY CALCULI.

93.) This name, and that of *gall-ſtones*, has
applied to certain concretions which occur
gall-bladder, or in the duct by which the
aſſes into the inteſtines. They have long at-
d the notice of phyſicians, as by obſtructing
pping the paſſage of the bile, they occaſion
undice.—Four kinds of them have been di-
iſhed. The firſt is always of a white, yel-
or greeniſh colour, of an oval ſhape, and
times as large as a pigeon's egg; and con-
y includes a nucleus of inſpiſſated bile. Its
fic gravity is leſs than that of water, being
t 0·803. It is inſoluble in water, but diſſolves
t alcohol, from which it drops in brilliant
s when the alcohol cools. It alſo melts by
and cryſtallizes when cooling. It is ſoluble
of turpentine, and with alkalies forms a ſoap.
croy has given the ſubſtance of which this concretion is compoſed the name of *adipocire*, from its reſemblance both to fat and to wax.—The ſecond ſpecies is of a polygonal ſhape, and a number of them is always found in the ſame gall-bladder together. In compoſition this ſpecies differs little from the former, being almoſt wholly compoſed of adipocire.—The third ſpecies conſiſts entirely of inſpiſſated bile, and has not been found in the human ſpecies, though it is frequent in oxen and other inferior animals.—Concerning the 4th ſpecies very little is known, except that it neither diſſolves in alcohol nor in oil of turpentine.

IV. URINARY CALCULI.

(2594.) The moſt frequent, as well as the moſt formidable of all the morbid concretions, are thoſe which form in the bladder and other urinary organs. They obtained the name of *calculi* from a ſuppoſition they were *ſtones*. They are either egg-ſhaped, or polygonous, or reſemble a cluſter of mulberries, in which caſe they have obtained the name of *mulberry*. Many of them are very ſmall, and ſome exceed the ſize of a gooſe-egg. Their colour is deep brown, white, or dark grey, and often theſe colours are intermixed. Their ſurface is ſometimes ſmooth, ſometimes rough and unequal. Their ſpecific gravity varies from 1·213 to 1·976.—The ſubſtances of which they are compoſed are

1. Uric acid
2. Urate of ammonia
3. Phoſphate of lime
4. Phoſphate of magneſia and ammonia
5. Oxalate of lime
6. Silica
7. Animal matter.

(2595.) 1. Many of theſe calculi are compoſed entirely of uric acid, and moſt of them contain a greater or ſmaller proportion of this acid in their compoſition. The uric calculi are brown, poliſhed, and reſemble wood. They readily diſſolve in ſolution of potaſh or ſoda, from which any weak acid precipitates the uric. The precipitate is ſoluble in nitric acid, and the ſolution tinges the ſkin red.—2. The calculi compoſed of urate of ammonia occur leſs frequently than the former, though this ſubſtance enters into the compoſition of various other calculi. The only pure concretions of this ſort, are the very ſmall polygonal calculi, ſeveral of which are found in the bladder at the ſame time. They are compoſed of thin layers, have the colour of a diſh of coffee, and rapidly diſſolve in fixed alkaline leys, while they emit the odour of ammonia during ſolution.—3. The calculi compoſed of phoſphate of lime, which occurred to Fourcroy and Vauquelin, were white, and appeared like chips of broken chalk, which were held together by a gelatinous matter. They were ſoluble in nitric, muriatic, and acetic acids; and again precipitated by ammonia, fixed alkalies, and oxalic acid. The gelatinous part retained the form of a membrane after the earthy part was diſſolved by very diluted acids.—4. Calculi compoſed of phoſphate of magneſia and ammonia never occur without combination with other ſubſtances, ſometimes phoſphate and ſometimes oxalate of lime, and ſometimes it covers uric acid. Theſe calculi conſiſt of white, ſemi-tranſparent, lamellar layers; and ſometimes this ſubſtance is cryſtallized on their ſurface in the form of priſms. It is very ſoluble in acids, though much diluted; and alkalies decompoſe it, leaving magneſia undiſſolved. —5. Oxalate of lime, combined with phoſphate of lime, and uſually with uric acid, was firſt detected in the *mulberry* calculi by Dr Wollaſton: Fourcroy and Vauquelin found ſeveral calculi compoſed entirely of oxalate of lime and animal matter. Such calculi are of a dark green colour, very hard and difficult to ſaw aſunder; and while ſawing emit the ſmell of ſemen. They take a poliſh like ivory. They are only ſoluble, ſlowly and with difficulty, in very diluted nitric acid, but are decompoſed by the carbonates of potaſh and ſoda. —6. Fourcroy and Vauquelin, who analyzed upwards of 600 calculi, only found ſilica in two inſtances, in two *mulberry* calculi, where it was mixed with phoſphate of lime. Theſe calculi were of a lighter colour than uſual, very hard, difficult to ſaw or reduce to powder. Such an occurrence is very uncommon, and not eaſily accounted for.—7. The animal matter, which enters into the compoſition of calculi, ſeems to be the cement which holds the more ſolid particles together. It may be eaſily known by the blackening of the calculi when expoſed to great heat, and by their emitting the ſmell of ammonia.

(2596.) The calculi hitherto found in the bladders of the inferior animals are of a mixed nature. Thoſe found in the graminivorous animals, ſuch as the horſe, rabbit, ox, and ſow, are chiefly compoſed of carbonate of lime, mixed with animal matter. Thoſe found in the carnivorous are chiefly compoſed of earthy phoſphates. In the dog, the hog, the rat, and the cat, have been found calculi ſimilar, and compoſed of the ſame ingredients with thoſe in man. Theſe animals feed nearly in the ſame way with man: and it would ſeem that the ſpecies of the food determines the ſpecies of the urinary calculi.—But to decide this point a ſufficient number of experiments have not yet been made.

(2597.) As the accumulation of theſe concretions in the bladder, is one of the moſt dreadful diſeaſes to which the human frame is liable, various noſtrums have been cried up in all ages which had for their object either to prevent their accumulation, or to diſſolve them after they were accumulated. Super-carbonate of potaſh, commonly known under the name of *aërated alkaline water*, has been much recommended of late, and many perſons labouring under urinary calculi, or gravel, have obtained at leaſt a temporary relief from ſwallowing occaſional doſes of it. But we are not ſure whether the alkali ever reaches the bladder without combining with ſome other ſubſtance which may deſtroy its activity; and after it gets there it can only act on the conſolidated uric acid. Hence we are not certain whether it acts as a preventative of further accumulation, or as a ſolvent of what is already accumulated. Fourcroy and Vauquelin, after a laborious analyſis of many hundreds of urinary calculi, propoſe the immediate ſolution of theſe concretions by injections into the bladder through the urethra. To effect this it is only neceſſary to provide ſolvents for three ſpecies of calculi, namely:—

1. Uric acid, and urate of ammonia
2. The phoſphates
3. Oxalate of lime.

(2598.) The bladder, in all caſes, being previouſly evacuated of urine, a ſolution of pure potaſh, or of ſoda, ſo weak that it can be kept in the mouth or ſwallowed without pain, being injected into the bladder, will diſſolve calculi compoſed of uric acid, or of urate of ammonia. But as we do not know the ſpecies of calculus contained in the bladder, the injected liquor being retained as long as the patient can bear it without inconveniency, ſhould be evacuated, filtered, mixed with a little muriatic acid; and if uric acid has been diſſolved, a white precipitate will appear. This will prove that if not the whole, the baſis at leaſt of the calculus is uric acid; and the injection may be repeated as indications are favourable.—If no indication of uric acid appear, it may be preſumed that the calculus is compoſed of phoſphates, and theſe may be readily diſſolved by the nitric or muriatic acids, ſo much diluted as not to be more acrid than urine itſelf. An injection of weak muriatic acid ſeems preferable to the nitric, and after it is retained as long as it does not annoy the patient, let it be evacuated and mixed with ammonia. If phoſphate of lime has been diſſolved, a precipitate will enſue; proving the calculus to be a phoſphate.—If this ſhould not happen, it may be preſumed that oxalate of lime is its baſis, and injections of weak nitric acid muſt be had recourſe to, which operate on this ſalt very ſlow, and imperfectly.—The injections ſhould be previouſly heated to the temperature of the body. Each of them ſhould be perſevered in during ſeveral days, until the ſpecies of the calculus be clearly aſcertained. They ſhould afterwards be occaſionally varied, in order to corrode the animal matter, as well as the ſaline concretions. While an injection remains in the bladder, the patient ſhould remain in ſuch a poſture as to render it certain that the calculus is immerſed in it.—Some think that theſe concretions owe their commencement to a habit of voiding urine in a reclined poſture, and recommend an erect poſition, during this diſcharge, as a preventative.

V. GOUTY CONCRETIONS.

(2599.) Theſe are formed in the joints of perſons labouring under the gout. From their whiteneſs and ſoftneſs they have obtained the name of *chalk ſtones*; and there have been perſons labouring under this diſeaſe who could write upon a wall, with the knuckles of their fingers, as if it had been done by chalk. They are uſually ſmall, but have ſometimes been obſerved of the ſize of an egg. In 1797, Dr Wollaſton aſcertained them to be compoſed of uric acid and ſoda. If uric acid, ſoda, and a little warm water be triturated together, a maſs is formed which, after the exceſs of ſoda is waſhed off, has all the properties of gouty concretions. Phyſicians have never penetrated the cauſe of this diſeaſe, nor diſcovered a method of cure.

SECT. VII. MORBID SECRETIONS.

I. PUS.

(2600.) This is diſcharged from wounds and ſores, and when it indicates a healing ſtate, it is called *healthy*, or *good-conditioned* pus. It is of the conſiſtence of cream, of a yellowiſh white colour, with hardly any taſte or ſmell. Before the microſcope it appears like white globules ſwimming in a tranſparent fluid. It gives no indication of acid or alkaline properties, but becomes acid on expoſure to the air. It dries by heat, and aſſumes the appearance of horn. By diſtillation, Bergman obtained one fourth of inſipid water; then ammonia and gaſeous bodies which were not examined; then concrete carbonate of ammonia and empyreumatic oil. A light brilliant coal, of difficult incineration was left, and the aſhes gave traces of iron.

(2601.) Pus agitated with water becomes milky, but ſeparates when left undiſturbed. If long agitated, with aſſiſtance of heat, it forms a milky liquor which paſſes through the filter.—Alcohol thickens but does not diſſolve it.—Pus diſſolves in the concentrated ſulphuric, nitric, and muriatic acids, but ſeparates from them on adding water. With alkalies it forms a whitiſh ropy fluid, which is decompoſed by adding water.—Such are the properties of good pus, and it ſeems nearly allied to albumen.

(2602.) But ill conditioned pus is much thinner, is ſomewhat acrid, and emits a fetid ſmell. Mr Cruickſhanks examined pus from what is called the hoſpital ſore. Lime-water corrected its odour, but did not deſtroy it. Sulphuric acid, alcohol and ſolution of arſenic in potaſh increaſed it. It is deſtroyed by the nitrate and oxymuriate of mercury; by the nitric and oxymuriatic acids. Mr Cruickſhanks thinks this pus a matter *ſui generis*, which is capable of generating more, and of producing an alteration in the ſyſtem. Hence to cure the ſore, the pus muſt be deſtroyed, which is effected by waſhing it with nitrate of mercury, diluted nitric acid, or oxymuriatic acid, at every dreſſing.

(2603.) Dr Crauford examined the matter of cancer, and found it gave a green colour to ſyrup of violets. Sulphuric acid extricated from [illegible] a gas reſembling ſulphureted hydrogen, which he ſuppoſes to exiſt in the matter combined with ammonia. Oxymuriatic acid deſtroys the odour of this matter, and Dr Crauford recommends this liquid as very proper for waſhing cancerous ulcers.

(2604.) Very little is yet known concerning the properties of morbid ſecretions, though a knowledge of them would be of great importance to the healing art. There are ſeveral of them which are entirely unknown, though each produces a diſeaſe peculiar to itſelf. As examples of theſe we may mention the matter of ſmall-pox, of venereal ulcers, of cow-pox, of itch, of plague, of leproſy, &c. &c.

II. LIQUOR OF DROPSY.

(2605.) The liquor which accumulates in different cavities of the body, during this diſeaſe, is of a yellowiſh green colour, is ſometimes turbid, and ſometimes nearly tranſparent. Wurzer found a colourleſs liquor taken from a dropſical patient, to contain albumen, mucus, ſulphureted hydrogen, phoſphate of lime, muriate of ſoda, and ſoda. Dr Boſtock found a colourleſs liquid taken from a tumour in the ſpine called *ſpina bifida*, to contain the following ingredients:—

Water	97·8	
Muriate of ſoda .	1·0	
Albumen . . .	0·5	
Mucus	0·5	} properties conjectural.
Gelatine . . .	0·2	
Lime, a trace		
	100·0.	

III. LIQUOR OF BLISTERS.

(2605.) Margueron found this liquor to reſemble the ſerum of the blood. From 200 parts of it he obtained

36	albumen
4	muriate of ſoda
2	carbonate of ſoda
2	phoſphate of lime
156	water
200.	

DIVISION XIII.

APPLICATION OF CHEMISTRY TO ARTS AND MANUFACTURES.

When we firſt entered upon this work, we intended to have made the application of chemiſtry to Agriculture and other arts, a ſeparate Treatiſe. But as, in the progreſs of the work, we found it more expedient to digreſs largely on the application of each ſeparate branch of chemiſtry to the uſeful arts, ſo that the chemical principle, and its practical application, might be at once under the eye of the reader; we ſee no neceſſity for now preſenting this as a ſeparate branch of the ſubject. Such things as have been omitted in the preceding treatiſe, concerning the application of chemiſtry to uſeful arts, will be found, under their proper titles, in other parts of this work.

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CHEMKON, or Chencour, a town of Armenia, on the frontiers of Gurgiſtan, which has a beautiful caſtle, grand caravanſeras, and ſeveral moſques. It is 160 miles NE. of Erivan.

(1, 2.) CHEMNITZ, a town of Germany, ſituated on a river of the ſame name, in Upper Saxony, and marquiſate of Meiſſen, containing there chruches, and an hoſpital. It is ſurrounded with walls and ditches, and has four ſuburbs, and a caſtle about a mile from the town. Great quantities of cottons, and other fine ſtuffs are made here; and the bleaching buſineſs is very conſiderable. It lies 36 miles WSW. of Dreſden, and 32 SW of Meiſſen.

(3.) CHEMNITZ, Martin, a famous Lutheran divine, born at Britzen in Brandenburg, in 1522. He was educated under Melancthon, after whoſe death he was the moſt eſteemed among all the divines of the Augſburg confeſſions; and was employed in ſeveral important negociations by the princes of the ſame communion. He was an able mathematician and aſtronomer; and was 30 years profeſſor at Brunſwick, where he died in 1586. His principal work is his *Examen Conſilii Tridentini*.

CHEMOSH. See Chamos.

CHEMOSIS, a diſeaſe of the eye, proceeding from inflammation; wherein the white of the eye has a jelly-like appearance, and ſwells above the tranſparent cornea. It may be cured by almoſt any mildly aſtringent eye-water, eſpecially if a very minute portion of camphor be added.

CHENCE, in our ancient barbarous cuſtoms, the ſame with Amabyr; which ſee.

CHENEROTES, birds of the gooſe kind, ſaid by Pliny to have been common in Britain; and ſuppoſed to be the Anas Chenalopex.

CHENISCUS, [from χην, a gooſe,] in antiquity, an ornament in the form of geeſe, uſed on the prows and ſterns of their ſhips.

CHENOLEA, a genus of the order monogynia, belonging to the pentandria claſs of plants.

CHENOPODIUM, Goose-foot, or Wild Orach: A genus of the digynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 12th order, *Holeraceæ*. The calyx is pentaphyllous and pentagonal; no corolla; one ſeed lenticular, ſuperior. There are 18 ſpecies, 13 of which are natives of Britain. Moſt of them have an aromatic ſmell. A ſpecies which grows near the Mediterranean is uſed by the Egyptians in ſallads, on account of its ſaltiſh aromatic taſte. From this plant kelp is made in other countries.

1. Chenopodium Ambrosoides, or the oak of Cappadocia. Theſe are eaſily propagated from ſeeds, and thrive beſt in a rich ſoil.

2. Chenopodium Bonus Henricus, or common Engliſh mercury, found growing naturally in ſhady lanes in many places in Britain. It has large triangular, arrow-pointed, entire leaves; upright, thick, ſtriated ſtalks, garniſhed with triangular leaves, and terminated by cloſe ſpikes of apetalous yellowiſh green flowers in June and July, which are ſucceeded by ripe ſeeds in Auguſt. This ſpecies was formerly uſed as ſpinach; but is now diſuſed, being greatly inferior. As an article of the materia medica, it is ranked among the emollient herbs, but rarely uſed in practice. The leaves are applied by the coutry people for healing ſlight wounds, cleanſing old ulcers, and the like purpoſes. The roots are given to ſheep that have a cough. Goats and ſheep are not fond of the herb; cows, horſes, and ſwine, refuſe it.

3. Chenopodium Botrys, or the oak of Jeruſalem, like that of Cappadocia, thrives beſt in a rich light earth, and may be eaſily propagated from ſeeds, as indeed all the other ſpecies may be.

4. Chenopodium Scoparia, the Belvidere, or *annual mock cypreſs*, is of a beautiful pyramidal form, reſembling a young cypreſs tree. This is a plant much eſteemed in China. The following are the properties attributed to it in the Chineſe Herbal. About the end of March and beginning of April, the belvidere ſprings up; its ſuckers or ſhoots riſe to the height of 8 or 9 inches, in ſhape of a child's fiſt half ſhut; it afterwards extends itſelf, and ſends forth a number of branches loaded with leaves like thoſe of flax; and as it grows, its branches arrange themſelves naturally in the form of a beautiful pyramid; its leaves, yet tender, abound with juice, and have a very agreeable taſte; it may be eaten as a ſallad with vinegar, to which a little ginger has been added; that being prepared like other leguminous plants, and baked with meat, it gives it an agreeable and pleaſing flavour. When in its full beauty, its leaves become hard and unfit for the table; but nouriſhment is then found in its root, which ſerves as a reſource in times of famine and ſcarcity. When the belvidere has attained to his natural ſize, the Chineſe ſeparate its principal ſtalk from the reſt, and put it into a lye of aſhes, which cleans and ſoftens it, and frees it from all impurities of the bark. After this bath, it is expoſed to the ſun; and, when dry, it is baken and ſeaſoned. As to the root, which has ſomething of a violet colour, they ſtrip off the ſkin by filaments, which may be boiled and eaten: but what is particularly ſought after, is the root itſelf; of which, when reduced to powder, they collect only what remains in the bottom of the veſſel, and form it into ſmall loaves, that are baked by being held over the ſteam of boiling water. People of a delicate taſte will ſcarcely be tempted to admit this diſh at their tables; but in caſes of neceſſity, any perſon may have recourſe, without danger, to this ruſtic food. In ſuch caſes, we will be indebted to the Chineſe for having made the firſt trial. The Chineſe Herbal cites the example of four mountaineers, who having lived on nothing but the leaves, roots, and ſtalks, of the belvidere, with which their country abounded, had nevertheleſs enjoyed perfect health to a very great age.

CHENSERS, in old ſtatutes, ſuch as paid *cenſe*, quit rent, or chief rent.

CHEN-SI, or Shen-si, a province of China, bounded on the E. by Hoang-ho, which ſeparates it from Chan-ſi, on the S. by the provinces of Se-tchuen and How-quang, on the N. by Tartary and the great wall, and on the W. by the country of the Moguls. It is one of the moſt extenſive provinces of the empire; and has two viceroys, beſides the governors of So-tcheou, and Kan-tcheou, which are the ſtrongeſt places in the country. The climate is temperate, and the people civil and affable to ſtrangers. The ſoil is fertile, and produces plentiful crops of wheat and millet. They have alſo honey, wax, muſk, rhubarb, cinabar, and coal-mines. Gold duſt is waſhed down by the torrents and rivers. They have a vaſt number of dear, bears, muſk goats, wild bulls, &c. beſides an animal reſembling a tiger, whoſe ſkin is ſingularly beautiful; a ſpecies of bats as large as hens, and ſeveral other animals quite unknown in Europe. The province is divided into two parts, the E. and the W. and contains 8 cities of the 1ſt rank, and 106 of the 2d and 3d. Singan-fou is the capital.

CHEPELIO, an iſland in the bay of Panama and province of Darien, in South America, ſituated about 3 leagues from the city of Panama, which it ſupplies with proviſions. Lon. 80. 15. W. Lat. 8. 46. N.

CHEPO, a river of S. America, which falls into the Pacific Ocean.

CHEPSTEAD, a town in Chevening, Kent.

CHEPSTOW, a ſea port town of England, in the county of Monmouth; ſituated near the mouth of the Wye, over which there is a high bridge. It is a large and flouriſhing town, formerly walled round, and defended by a caſtle, part of which ſtill remains Chepſtow is the port for all the towns ſeated on the Wye and Lug. Ships of 600 tons burden are built here and even thoſe of 700 tons come up to the town; hence it became ſo flouriſhing, of late years, that the merchants imported their own wines from Oporto, and deals, hemp, flax, pitch, tar, &c. from Norway and Ruſſia. The tide comes in at this place with greater rapidity than at Briſtol, and ſome time riſes at the bridge 50 or 60 feet perpendicular. This bridge connects Monmouth and Glouceſter ſhires, and is maintained at their joint expenſe: in 1790 and 1791 it underwent a thorough repair. There are five conſtant trading veſſels betwixt this port and London. It lies 28 miles SW. of Glouceſter, and 134 WNW. of London, Lon. 2. 36. W. Greenwich. Lat. 51. 42. N.

CHEQ, or Cherif, the prince of Mecca, who is high prieſt of the law, and ſovereign pontiff of all the Mohametans of whatever ſect or country they be. See Kalifh. The grand ſignior, ſophis, moguls, khans of Tartary, &c. ſend him yearly preſents, eſpecially tapeſtry to cover Mahomet's tomb, together with a ſumptuous tent for himſelf, and vaſt ſums of money to provide for all the pilgrims during the 17 days of their devotion.

* *To* CHEQUER. See *To* Checker.

(1.) CHER, a department of France, which comprehends part of the ci-devant province of Berry. It is bounded on the E. by the department of Nivre; on the S. by that of Allier; on the W. by theſe of Indre, Loire, and Cher; and on the N by Loiret. Bourges is the chief town.

(2.) Cher, a river of France, which gives name to the above department. It riſes in Combraille; is navigable above Vierzon, and, after watering Tours, falls into the Loire, 5 miles above the mouth of the Indre.

(3.) Cher, a river of France, which riſes in the Weſgaw mountains, in the department of the Lower Rhine, and falls into the Audlau.

CHERAMIS, [from χηραμος, a hollow place,] an ancient medical meaſure often mentioned by Hippocrates.

(1.) CHERASCO, a territory of Piedmont, about 9 miles in diameter.

(2.) Cherasco, or Chiarasco, the capital of the above territory, with a ſtrong citadel, to which the king of Sardinia, retired in 1706, during the ſiege of Turin. It is ſeated at the confluence of the rivers Sturia and Tanaro, upon a mountain; 14 miles SE. of Turin. Lon. 7. 58. E. Lat. 44. 45. N.

CHERAWS, a diſtrict of S. Carolina, about 83 miles long and 63 broad. It is bounded on the N. and NE. by North Carolina; on the SE. by George-town diſtrict, and on the SW. by Lynch's Creek, which ſeparates it from Camden. It is divided into 3 counties; viz. Cheſterfield, Darlington, and Marlborough. This diſtrict is well watered by the river Great Pedee, and by Jeffrey's, Thomſon's neck, Lynch's, and Three Neck Creeks. Greenville and Chatham are the chief towns.

CHERBURG, a ſea port town of France, in the department of the Channel, and ci-devant province of Normandy, with a harbour, and late Auguſtine abbey. It contains about 5000 inhabitants, who are chiefly employed in building ſmall ſhips, and in manufacturing woollen ſtuffs. It is remarkable for the ſea fight between the Engliſh and French fleets in 1692. when the latter were beat, and upwards of 20 of their men of war burnt near Cape la Hogue. The Britiſh landed here in Auguſt 1758, and took the town, with the ſhips in the baſon, demoliſhed the fortifications, and ruined the other works which had been long carried on for enlarging the harbour and rendering it more ſafe and convenient. Immenſe ſums have ſince been expended in the erection of piers, deepening and enlarging the harbour and erecting fortifications. It now admits veſſels of 900 tons at high water and of 250 at low. It is 50 miles N. W. of Caen. Lon. 1. 33. W. Lat. 49. 38. N.

CHERCHIAJO, or Cerchialo, a lake near Monte Rotondo in Sienna, where borax is found.

CHEREM, in Jewiſh antiquity, a ſpecies of annihilation. The word, in the Hebrew, ſignifies to deſtroy, exterminate, devote, or anathematiſe. Cherem is likewiſe ſometimes taken for that which is conſecrated, vowed, or offered to the Lord, ſo that it may no longer be employed in common or profane uſes. Some aſſert, that perſons thus devoted were put to death; whereof Jephthah's daughter, they argue, is a memorable example. Judges xi. 30, &c. See Jephthah. Cherem is alſo a kind of excommunication uſed among the Jews. See Niddui.

CHERESOUL, or Chahrzul, a town of Turkey in Aſia, capital of Curdiſtian, and the ſeat of a beglerbeg. It is 150 miles N. of Bagdad. Lon. 45. 15. E. Lat. 35. 30 N.

CHERETHIM, or } 1. A tribe of Philiſtines,
CHERETHITES, } who inhabited Cherith: 2. A party of David's life-guards, probably natives of that town, who had followed him into Judea, after he left Gath. They are always mentioned in conjunction with the Pelethites.

CHERILUS, of Samos, a Greek poet, who flouriſhed A. A. C. 479. He ſung the victory gained by the Athenians over Xerxes, and was rewarded with a piece of gold for every verſe. His poem had afterwards the honour of being rehearſed yearly with the works of Homer.

CHERINGTON, three Engliſh villages; viz. 1. in Glouceſterſhire, 3 miles S. E. of Minching-Hampton: 2, in Warwickſhire, near Shipton: and, 3. in Wilts, S. E of Devizes.

* *To* CHERISH. *v. a.* [*cherir*, Fr.] To ſupport and forward with encouragement, help, and protection; to ſhelter; to nurſe up.—

> Whenever Buckingham doth turn his hate
> Upon your grace, and not with duteous love
> Doth *cheriſh* you and yours, God puniſh me
> With hate. *Shakeſpeare.*

—What doth *cheriſh* weeds but gentle air. *Shak.*

* CHERISHER. *n. ſ.* [from *cheriſh*.] An encourager: a ſupporter.—One of their greateſt praiſes it is to be the maintainers and *cheriſhers* of a regular devotion, a reverend worſhip, a true and decent piety. *Sprat.*

CHERITH, in ancient geography, 1. A diſtrict of Canaan belonging to the Philiſtines: 2. A river of Canaan memorable for having refreſhed the prophet Elijah during his exile. 1 Kings xvii. 3, 4. Commentators differ about its ſituation. Some ſay it runs from the E. into Jordan, a little S. of Bethſhan: Bunting repreſents it as running E. into that river between Bethel and Ai; but Bochart aſſerts it to be the ſame with the KANAH.

CHERLBURY, near Chadlington, Oxford.

CHERLERIA, in botany: A genus of the trigynia order, belonging to the decandria claſs of plants: and in the natural method ranking under the 22d order, *Caryophylleæ*. The calyx is pentaphyllous; there are 5 nectaria, bifid, and petal-like; the antheræ alternately barren: the capſule is trilocular and three-valved.

CHERLESQUIOR, in Turkiſh affairs, denotes a lieutenant general of the grand ſignior's armies.

(I.) CHERMES, in entomology, a genus of inſects belonging to the order of inſecta hemiptera. The roſtrum is ſituated on the breaſt; the feelers are longer than the thorax; the 4 wings are deflected; the thorax is gibbous; and the feet are of the jumping kind. See *Plate* LXV. *fig.* 8. There are 17 ſpecies; and the trivial names are taken from the plants which they frequent. The following are the moſt remarkable:

1. CHERMES ABIETIS, the fir tree chermes, as well as ſeveral other ſpecies, are provided at the extremity of their body with a ſharp pointed implement, but which lies concealed. This they draw out to depoſit their eggs, by making a puncture in the plant that ſuits them; and thus produce that enormous ſcaly protuberance that is to be found at the ſummit of the branches of that tree, and which is formed by the extravaſation of the juices occaſioned by the punctures. The young larvæ ſhelter themſelves in cells contained in the tumor.

2. CHERMES BUXI, the box tree chermes, produces no tubercula; but its punctures make the leaves of that tree bend and grow hollow in the ſhape of a cap, which, by the union of thoſe inflected leaves, produces at the extremity of the branches a kind of knobs, in which the larvæ of that inſect find ſhelter. The box chermes, as well as ſome others, has yet another peculiarity; viz. that the larva and its chryſalis eject at the anaus: white ſweet-taſted matter, that ſoftens under the touch, and is not unlike manna. This ſubſtance is found in ſmall white grains within the balls formed by the box leaves, and a ſtring of the ſame matter is often ſeen depending from the anus of the inſect.

3. CHERMES FICUS, or *fig tree bug*, one of the largeſt of the genus, is brown above and greeniſh beneath. The antennæ, likewiſe brown, are large, hairy, and one third longer than the thorax. The feet are yellowiſh; the wings large, twice the length of the abdomen. They are placed ſo as to form together an acute roof. The membrane of which they conſiſt is thin and very tranſparent; but they have brown veins, ſtrongly marked, eſpecially towards the extremity. The roſtrum of this ſpecies is black, and takes its riſe from the lower part of the thorax, between the firſt and ſecond pair of feet. It is an inſect to be met with in great numbers upon the fig tree. The larva has ſix feet. It is like the inſect, when provided with wings. Its form is oblong, and its motion ſlow. The chryſalis differs from it by two flat buds that ſpring from the thorax and incloſe the wings afterwards ſeen in the perfect inſect. Theſe chryſalids are frequently met with on plants; and the two plates of their thorax give them a broad uncouth appearance, and a heavy look. When the little chryſalids are going to be metamorphoſed, they remain motionleſs under ſome leaves which they fix themſelves upon. Their ſkin then divides upon the head and thorax, and the perfect inſect comes forth with his wings, leaving the ſpoil of his chryſalis open and rent anteriorly upon the leaf. Theſe kind of ſloughs are often found beneath the leaves of the fig tree. The perfect inſect is furniſhed with 4 wings, large in proportion to its body, veined, and placed in the form of a roof; and with them it flies. It has alſo the faculty of leaping pretty briſkly, by means of its hinder legs, which play like a ſpring. When it is attempted to catch the chermes, it makes its eſcape rather by leaping than flying.

4. CHERMES GRAMINIS, the *graſs bug*, frequents only graſſes and low ſhrubs.

5. CHERMES PINUS, the *pine tree chermes*, ſeems to be produced much in the ſame manner with thoſe of the fir tree, (N° 1.) from the white down under which their larva is found.

6. CHERMES ULMI, the *elm bug*, inhabits the elm and fixes its larva upon the leaves, in a manner ſimilar to thoſe of the fig tree, N° 3.

(II.) CHERMES MINERAL. See CHEMISTRY, *Index*; and KERMES.

CHERMITES, or CHERNITES, in ancient natural hiſtory, a ſpecies of very bright and white marble or alabaſter, called afterwards LYGDINUM.

CHERNIBS, in antiquity, [from χειρ, the hand, and νιπτω, to waſh,] a veſſel wherein the people waſhed their hands, before they went to religious ſervice.

(1.) CHEROKEE, a river of North Carolina; which for many miles is called BROAD-TENESSEE. See that article and TENASSEE.

(2.) CHEROKEE MOUNTAINS, a name given to a part of the Allegany or Appalachian mountains. See theſe articles.

CHEROKEES, a nation of American Indians reſiding in the northern parts of Georgia, and the ſouthern parts of the new State of Tennaſſee. Their territory has the Cherokee mountains on the E. which ſeparate it from N. and S. Carolina, the river Cherokee on the N. and W. and the territory of the Creek Indians on the S. Their towns which are about 40 in number, are ſituated on the S. ſide of the Cherokee, above the Muſcle Shoals, and the head waters of the river Cooſe. The Cherokees are robuſt, well made, and taller than any other nation of American Indians, or even than the Anglo-Americans; being in general ſix feet high, and ſome even higher. Their complexion is brighter than that of the other Indians. Their women are tall, ſlender, delicate, and many of them as fair and blooming as the Anglo-American ladies. In their diſpoſitions, they are grave; in their deportment dignified, circumſpect, and uniform; cautious and reſerved with ſtrangers, but frank and ſocial with their friends. In their intercourſe with mankind, they are brave, juſt, and liberal; in their councils deliberate, ſecret, and reſolute. They were formerly a very powful nation; but having been for many years at war with the Carolinians, after loſing many important battles, in which their principal warriors were ſlain, they were at laſt compelled to ſubmit to the ſuperior proweſs of the Anglo-Americans. They have for theſe many years paſt paid homage to the Creek confederacy, but with much reluctance.

CHEROPOTAMUS. See Hippopotamus.

(1.) * CHERRY. *adj.* [from the ſubſtantive.] Reſembling a *cherry* in colour.—

Shore's wife had a pretty foot,
A *cherry* lip, a paſſing pleaſing tongue. *Shak.*

(2.) * Cherry. Cherry-tree. *n. ſ.* [*ceriſe*, Fr. *ceraſus*, Lat.] The ſpecies are; 1. The common red or garden cherry. 2. Large Spaniſh cherry. 3. The red heart cherry. 4. The white heart cherry. 5. The bleeding heart cherry. 6. The black heart cherry. 7. The May cherry. 8. The black cherry or mazard. 9. The archduke cherry. 10. The yellow Spaniſh cherry. 11. The Flanders cluſter cherry. 12. The carnation cherry. 13. The large black cherry. 14. The bird cherry. 15. The red bird or Corniſh cherry. 16. The largeſt double flowered cherry. 17. The double flowered cherry. 18. The common wild cherry. 19. The wild northern Engliſh cherry, with late ripe fruit. 20. The ſhock or perfumed cherry. 21. The cherrytree with ſtriped leaves. And many other ſorts of cherries; as the amber cherry, lukeward, corone, Gaſcoigne, and the morello, which is chiefly planted for preſerving.—This fruit was brought out of Pontus at the time of the Mithridatick victory, by Lucullus, in the year of Rome 680; and was brought into Britain about 120 years afterwards, which was *Ann. Dom.* 55; and was ſoon after ſpread through moſt parts of Europe. *Miller.*—July I would have drawn in a jacket of light yellow eating *cherries*, with his face and boſom ſun burnt. *Peacham.*

(3.) Cherry, Barbadoes. See Malpighi.

(4.) Cherry, Bird. See Prunus.

(5.) Cherry, Cornelian. See Cornus.

(6.) Cherry, Dwarf. See Lonicera.

(7.) Cherry, Hottentot. See Caſſine.

(8.) Cherry, Laurel. See Prunus.

(9.) Cherry of the Alps. See Lonicera.

(10.) Cherry Tree. See N° 1. and Prunus.

(11.) Cherry, Winter. See Physalis and Solanum.

* Cherry-bay. See Laurel.

CHERRY Island, an iſland in the northern ocean, between Norway and Greenland. Lon. 20. 5. E. Lat. 74. 30. N.

* CHERRYPIT. *n. ſ.* [from *cherry* and *pit.*] A child's play, in which they throw cherry ſtones into a ſmall hole.—'Tis not for gravity to play at *cherrypit. Shak.*

CHERRY-VALLEY, a poſt town of New York in Otſego county, 14 miles SSW. of Canajoharie. It has a church, and lies 336 miles N. by E. from Philadelphia.

CHERSO, an iſland in the gulph of Venice, near Croatia. The air is good, but the ſoil ſtony, however, it abounds, in wine, cattle, oil, and excellent honey. Lon. 14. 40. E. Lat. 45. 11. N.

CHERSON, the capital of New Ruſſia, in the government of Catherinenſlaf, lately erected on the N. bank of the Dnieper, 10 miles below the mouth of the Ingulec. The church and many of the houſes are already built in an elegant taſte. The late empreſs Catharine II. intended it as the chief mart for all commodities exported and imported. It has a dock for large veſſels, from which ſeveral men of war and merchant ſhips have already been launched. It is ſupplied with fuel by reeds only, of which there is an inexhauſtible foreſt in the ſhallows of the Dnieper, oppoſite to the town. Rails and temporary houſes are made of them, as they are tall and ſtrong. They afford ſhelter to various kinds of aquatic birds; ſome of which are very beautiful. Several hundreds of malefactors are employed in erecting the fortifications and plantations. In 1787, the late empreſs made a triumphant journey to this capital, where ſhe met the emperor, Joſeph II. Her intention, it is ſaid, was to have been crowned Queen of Taurica, and empreſs of the Eaſt. But the deſign did not take place; and Catharine's ambition was obliged to reſt contented with inſcribing over one of the principal gates of this city,—"Through this gate lies *the road to Byzantium*;"— a road which, it is hoped, her ſon Paul will never travel, in the blood ſtained foot-ſteps of his mother. In this city, the celebrated Mr Howard, ſo well known for his univerſal philanthropy, in forming plans of improvement for priſons and hoſpitals fell a victim to his humanity, in 1790. Cherſon is 50 miles E. of Ockzacow. Lon. 33. 10. E. Lat. 46. 5. N.

* CHERSONESE. *n. ſ.* [χερσονησος.] A peninſula; a tract of land almoſt ſurrounded by the ſea, but joined to the continent by a narrow neck or iſthmus.

(1.) CHERSONESUS [from χερσος, land, and νησος, an iſland,] in ancient geography, was a name applied to ſeveral peninſulas; particularly.

1. Chersonesus aurea, in the Eaſt Indies, now called Malacca:

2. Chersonesus cimbrica, a part of Denmark, now thought to be Jutland:

3. CHERSONESUS TAURICA, now CRIM TARTARY: and

4. CHERSONESUS THRACICA, a peninſula of ancient THRACE, or modern ROMANIA, in European Turkey; bounded on the S. by the Archipelago; on the W. by the bay at the mouth of the Melas; on the E. by the ſtrait anciently called the Helleſpont; and on the N. by the continent, to which it is joined by a narrow neck of land, ſuppoſed by ancient authors to be 37 furlongs broad. There were once 11 cities upon it.

(2.) CHERSONESUS, one of the *ten new* States, into which the North Weſtern Territory of the United States of America is appointed to be divided.

(1.) * CHERT. *n. ſ.* [ſtom *quartz*, Germ.] A kind of flint.—Flint is moſt commonly found in form of nodules; but 'tis ſometimes found in thin ſtrata, when 'tis called *chert*. *Woodward*.

(2.) CHERT, PETROSILEX, LAPIS CORNEUS, or the HORNSTEIN of the Germans, is claſſed by Cronſtedt among the ſiliceous earths. See MINERALOGY, *Index*, and PETROSILEX.

CHERTSEY or } a market town of Surrey in
CHERTZEY, } England, about 7 miles W. from Kingſton upon Thames; and 20 W. by S. of London. Lon. 0. 30. W. Lat. 51. 25. N.

(1.) * CHERUB. *n. ſ.* [כרב *plur.* כרבים. It is ſometimes written in the plural, improperly. *cherubims*.] A celeſtial ſpirit, which in the hierarchy, is placed next in order to the ſeraphim. All the ſeveral deſcriptions which the Scripture gives us of *cherubim*, differ from one another; as they are deſcribed in the ſhapes of men, eagles, oxen, lions, and in a compoſition of all theſe figures put together. The hieroglyphical repreſentations in the embroidery upon the curtains of the Tabernacle. were called by Moſes *Exod*, xxvi. 1. *cherubim* of cunning work. *Calmet*.

(2.) CHERUB, *plural*, CHERUBIM. See HIERARCHY. *Cherub*, in Hebrew, is ſometimes taken for a calf or ox. Ezekiel deſcribes the face of a cherub as reſembling the face of an ox. The word in Syriac and Chaldee, ſignifies to *till* or plow, which is the proper work of oxen. Mr N. Bailey tranſlates it *fulneſs of knowledge*. Cherub alſo ſignifies *ſtrong* and *powerful*. Grotius ſays, that the Cherubim were figures like that of a calf. Bochart thinks they were more like that of an ox, and Spencer is of the ſame opinion. St John, in the Revelations, calls the cherubim *livings*. Clemens of Alexandria believes, that the Egyptians imitated the cherubim of the Hebrews in the repreſentations of their ſphinxes and hieroglyphical animals. The late learned Mr Hutchiſon beſtowed much labour to illuſtrate the ſymbolical meaning of the cherubim; which, however varied in their appearance, he conſidered as pointing forth the trinity in connection with the human nature. A later writer however, derives the word *cherub* from *rechub*, a chariot; and by comparing Pſalm xviii. 11. and 1 Chron xviii. 18. with Pſalm lxviii. 17. and ſimilar paſſages, makes it appear that the cherubim in the tabernacle and temple, &c. repreſented the angels ſurrounding the throne and miniſtering to the heirs of ſalvation, &c.

* CHERUBICK. *adj.* [from *cherub*.] Angelick; relating to the cherubim.—

And on the eaſt ſide of the garden place,
Cherubick watch. *Milton*.

(1.) CHERUBIM. See CHERUB, § 1 & 2.

(2.) CHERUBIM, the name of an ancient military order in Sweden, called alſo *Seraphim*. It was inſtituted by Magnus IV. in 1334, and aboliſhed by Charles IX. It took its denomination from the golden figures of cherubim, whereof the collar of the order was compoſed.

(1.) * CHERVIL. *n. ſ.* [*chærophyllum*, Lat.] An umbelliferous plant. *Miller*.

(2.) CHERVIL, GARDEN. See SCANDIX.

(3.) CHERVIL, WILD. See CHÆROPHYLLUM.

CHERZ, an ancient town of Poland in Maſſovia, 15 miles from Warſaw. Lon. 21. 8. W. Lat. 52. 1. N.

CHESAPEAK, in North America, one of the largeſt bays in the known world. Its entrance is NW. by W. between Cape Charles and Cape Henry in Virginia, 12 miles wide; and it extends about 300 miles N. through part of Virginia and the greater part of Maryland. Through this extent it is from 6 to 30 miles broad, and generally about 9 fathoms deep; affording many commodious harbours, and a ſafe and eaſy navigation. It receives from the W. beginning S. the waters of the James, York, Rappahanock, Potomac, Patuxent, Severn, Patapſco, Gunpowder, and Suſquehanna rivers; from the N. on the E. ſide, it receives thoſe of the Elk, Saſſafras, Cheſter, St Michaels, Choptank, Nanticoke, Wicomico, Manokin and Pocomoke; beſides many ſmall rivers. This bay is navigable for about 300 miles for large ſhips. and by means of the many navigable rivers that fall into it, ſhips go up to the very doors of the planters to take in goods. It is memorable for the ſea engagement, in 1781, between the Britiſh and French fleets under Admiral Graves, and Count de Graſſe. See AMERICA, § 33. This bay affords many excellent fiſheries for herrings, ſhad, &c, ſeveral thouſand barrels being annually cured at Potomac and Suſquehanna rivers, both for inland trade and exportation. It always abounds with oyſters, crabs, &c. and the number of ducks, ſwans, and other fowl, that frequent it, is incredible. Among theſe is a peculiar ſpecies of wild duck, called *Canvas Back*, which is larger than the common duck, and remarkable for the richneſs and delicacy of its fleſh, which is free of any fiſhy taſte.

CHESELDEN, William, an eminent anatomiſt and ſurgeon, born at Burrow on the Hill, in Leiceſterſhire, and deſcended from an ancient family in Rutlandſhire. He received the rudiments of his profeſſional ſkill at Leiceſter; and married Deborah Knight, a citizen's daughter, by whom he had one daughter, Williamina Deborah. In 1713, he publiſhed his *Anatomy of the Human Body*, in 1 vol. 8vo; and in 1723, A Treatiſe on the High Operation for the Stone. He contributed by his writings to raiſe his profeſſion to its preſent eminence. In 1736, he was thus honourably mentioned by Mr Pope; " As ſoon as I had ſent my laſt letter, I received a moſt kind one from you, expreſſing great pain for my late illneſs at Mr Cheſelden's. I conclude you was eaſed of that friendly apprehenſion in a few days after you had diſpatched yours, for mine muſt have reached you then. I wondered not a little at your quære, Who Cheſelden was? It ſhows that the trueſt merit does not travel ſo far any way as on the wings of poetry: he is the moſt noted and moſt deſerving man in the whole profeſſion of chirurgery; and has ſaved the lives of thouſands by his manner of cutting for the ſtone." He was on terms of the moſt intimate friendſhip with Mr Pope. In Feb. 1737, Mr Cheſelden was appointed ſurgeon to Chelſea hoſpital. He died at Bath, April 11, 1752, of a diſorder ariſing from drinking ale after eating hot buns.

CHESHAM, a town of Bucks, on the borders of Hertfordſh. 12 miles SE. of Aylſbury, and 29 W. by N. of London. It has a market on Wed. and fairs, April 21, July 22. and Sept. 28. Lon. 0. 36. W. Lat. 51. 42. N.

(1.) CHESHIRE, a county palatine of England ſeparated on the N. from Lancaſhire, by the Merſey, but juſt at the NE. point bordering on Yorkſhire: On the E. it is bounded by Derbyſhire; on the S by Shropſhire, and on the W. by Denbighſhire and Flintſhire, from which laſt it is ſeparated by the Dee; and on the NW. it is waſhed by the Iriſh ſea; that part of it being a peninſula, about 13 miles long and 6 broad, formed by the mouths of the Merſey and the Dee. Without including that peninſula, or a narrow tract of land, which ſtretches between Lancaſhire and Derbyſhire quite to Yorkſhire on the NE. the county extends 33 miles in breadth from N. to S. and 42 in length from E. to W. It is divided into 7 hundreds, and contained 101 pariſhes, 1 city, 11 market towns, and 191,751 inhabitants in 1801. The air and ſoil are in general good; and, except on the E. ſide, where it is rather mountainous, the general appearance of the country is that of an extended plain, particularly when viewed to the weſtward fom the high lands about Macclefield. It was formerly celebrated as the vale royal of England. The principal rivers are Merſey and the Dee: theſe receive and carry off to the ſea, the waters of the Weaver, Dane, Wheelook, Goyte, Bolling, and other ſmaller rivers and rivulets; moſt of which are well ſtored with fiſh. Cheſter is the city; the market towns are Nantwich, Macclesfield, Malpas, Middlewich, Northwich, Congleton, Altringham, Frodſham, Knotsford, Stockport, and Sandbach. Cheſhire has been long famous for its excellent cheeſe: the yearly export of which to London has been computed at 14,000 tons; to Briſtol and York, down the Severn and the Trent, 8000 more; beſides what is ſent to Scotland and Ireland. Cheſhire is alſo famous for its ſalt ſprings, at Namptwich, Middlewich, Winsford, and Northwich; at the laſt of which there are alſo vaſt pits of ſolid rock ſalt, which forms a great article of export. The other productions are corn, coal, ironore, millſtones, timber, allum, hops, &c. William I. erected this county into a palatinate, in favour of his nephew Hugh Lupus, to whom he granted the ſame ſovereignty and juriſdiction in it that he himſelf had in the reſt of the iſland. By this grant, the town of Cheſter enjoyed ſovereign juriſdiction within its own precincts, in ſo high a degree, that the earls held parliaments, conſiſting of their barons and tenants, which were not bound by the acts of the Engliſh parliament: but this exorbitant power of the palatinates was at laſt reduced by Henry VIII. However, all caſes and crimes, except thoſe of error, foreign pleas, foreign voucher, and high treaſon, are ſtill heard and determined within the ſhire. The earls were anciently ſuperiors of the whole county, and all the landholders were mediately or immediately their vaſſals, and under the like ſovereign allegiances to them as they were to the kings of England; but the earldom was united to the crown by Edward III. ſince which time, the eldeſt ſons of the kings of England have always been earls of Cheſter, as well as princes of Wales. Cheſhire ſends 4 members to parliament; two for the county, and two for the capital.

(2.) Cheshire, a well cultivated county of the United States, ſituated in the SW. corner of New Hampſhire. It is bounded on the W. by the river Connecticut, which ſeparates it from Windham and part of Windſor county in the ſtate of Vermont; on the E. by Hillſborough; on the S. by the ſtate of Maſſachuſetts, and on the N. by Grafton county. It is 60 miles long and 25 broad, and is divided into 34 townſhips It is watered by many ſmall rivers. The chief towns are Charleſton and Keene.

(3.) Cheshire, a townſhip of Connecticut, in New Haven County.

(4.) Cheshire, a townſhip of Maſſachuſetts, in Berkſhire county, famous for good cheeſe.

CHESIL bank, on the coaſt of Dorſetſhire, is compoſed of gravel and pebbles thrown up by the ſea. It is 9 miles long, and there is a narrow ſea between it and the ſhore. It joins Portland to the main land.

* CHESLIP. *n. ſ.* A ſmall vermin that lies under ſtones or tiles. *Skinner.*

CHESNE, Andrew Du, ſtyled *the Father of French hiſtory*, was born in 1584. He wrote, 1. A hiſtory of the popes. 2. A hiſtory of England. 3. An Inquiry into the antiquities of the towns of France. 4. A hiſtory of the cardinals. 5. A Bibliotheca of the Authors who have written the hiſtory and topography of France, &c. He was cruſhed to death by a cart, in going from Paris to his country houſe at Verriere, in 1640.

CHESNUT. See Chesnut, and Fagus.

(1.) * CHESS. *n. ſ.* [*eche*, Fr.] A nice and abſtruſe game, in which two ſets of men are moved in oppoſition to each other.—

This game the Perſian magi did invent,
The force of Eaſtern wiſdom to expreſs;
From thence to buſy Europeans ſent,
And ſtyl'd by modern Lombards penſive *cheſs*.
Denham.

(2.) Chess is played with different pieces of wood, on a board divided into 64 ſquares or houſes. Chance has ſo ſmall a ſhare in this game, that it may be doubted, whether a perſon ever loſt a game but by his own fault. Each gameſter has 8 dignified pieces, viz. a king, a queen, two biſhops, two knights, and two rooks; alſo 8 pawns: and each ſet for diſtinction's ſake, are painted, the one black and the other white.

(3.) **CHESS, ARRANGEMENT OF THE MEN AT.** The white king is placed on the 4th black houſe from the corner of the board in the firſt and lower rank; and the black king on the 4th white houſe on the oppoſite, or adverſary's, end of the board. The queens are placed next to the kings, on houſes of their own colours. Next to the king and queen, on each hand, the two biſhops; next to them, the two knights; and laſt of all, on the corners of the board, the two rooks. As to the pawns, they are placed, without diſtinction, on the ſecond rank of the houſe, one before each of the dignified pieces.

(4.) **CHESS, COMMENCEMENT OF THE GAME OF.** The onſet is commonly begun by the pawns, which march ſtraight forward in their own file, one houſe at a time, except at the firſt move. when a pawn can advance two houſes, but never moves backwards: the manner of taking the adverſary's men is ſide-ways, in the next houſe forwards; where having captivated the enemy, they move forward as before. The rook goes forward or croſs-ways through the whole file, and back again. The knight ſkips backward and forward to the next houſe, ſave one, of a different colour, with a ſidling march, and thus kills his enemies that fall in his way, or guards his friends that may be expoſed on that ſide. The biſhop walks always in the ſame colour of the field that he is placed in at firſt, forward and backward, aſlope, or diagonally, as far as he liſts. The queen's walk is more univerſal, as ſhe takes all the ſteps of the above-mentioned pieces, excepting that of the knight; and as to the king's motion, it is one houſe at a time, and that, either forward, backward, ſloping, or ſide-ways.

(5.) **CHESS, DIFFERENT VALUE OF THE PIECES PLAYED AT.** The higheſt piece next to the king is the queen; after her the rooks; then the biſhops, and laſt of all the dignified pieces comes the knight. The difference of the worth of pawns, is not ſo great as that of noblemen; only, the king's biſhop's pawn is the beſt in the field, and therefore the ſkilful gameſter will be careful of him. Any man may be taken, when he falls within the reach of any of the adverſary's pieces; it is otherwiſe with the king, who, in ſuch a caſe, is only to be ſaluted with the word *check*, warning him of his danger, out of which it is abſolutely neceſſary that he move; and, if it ſo happen that he cannot move without expoſing himſelf to the like inconveniency, it is *check-mate*, and the game is loſt.

(6.) **CHESS, GENERAL RULES FOR PLAYING AT.** 1. To begin the game, the pawns muſt be moved before the pieces, and afterwards the pieces muſt be brought out to ſupport them. The king's, queen's, and biſhop's pawns, ſhould be moved firſt, that the game may be well opened; the pieces muſt not be played out early in the game, becauſe the player may thereby loſe his moves: but above all, the game ſhould be well arranged before the queen is played out. Uſeleſs checks ſhould alſo be avoided, unleſs ſome advantage is to be gained by them, becauſe the move may be loſt, if the adverſary can either take or drive the piece away. 2. If the game is crowded, the player will meet with obſtructions in moving his pieces; for which reaſon he ſhould exchange pieces or pawns, and caſtle his king, (*i. e.* cover him with a caſtle) as ſoon as convenient, endeavouring at the ſame time to crowd the adverſary's game, which may be done by attacking his pieces with the pawns, if the adverſary ſhould move his pieces out too ſoon. 3. The men ſhould be ſo guarded by one another, that if a man ſhould be loſt, the player may have it in his power to take one of the adverſary's in return; and if he can take a ſuperior piece in lieu of that which he loſt, it would be an advantage, and diſtreſs the adverſary. 4. The adverſary's king ſhould never be attacked without a force ſufficient; and if the player's king ſhould be attacked without having it in his power to attack his adverſary's he ſhould offer to make an exchange of pieces, which may cauſe the adverſary to loſe a move. 5. The board ſhould be looked over with attention, and the men reconnoitred, ſo as to be aware of any ſtroke that the adverſary might attempt in conſequence of his laſt move. If, by counting as many moves forward as poſſible, the player has a proſpect of ſucceſs, he ſhould not fail doing it, and even ſacrifice a piece or two to accompliſh his end. 6. No man ſhould be played till the board is thoroughly examined, that the player may defend himſelf againſt any move the adverſary has in view; neither ſhould any attack be made, till the conſequences of the adverſary's next move are conſidered; and when any attack may with ſafety be made, it ſhould be purſued, without catching at any bait that may be thrown out in order for the adverſary to gain a move, and thereby cauſe the deſign to miſcarry. 7. The queen ſhould never ſtand in ſuch a manner before the king, that the adverſary, by bringing a rook or biſhop, could check the king if ſhe were not there; as it might be the loſs of the queen. 8. The adverſary's knight ſhould never be ſuffered to check the king and queen, or king and rook, or queen and rook, or the two rooks at the ſame time; eſpecially if the knight is properly guarded; becauſe, in the two firſt caſes, the king being forced to go out of check, the queen or the rook muſt be loſt; and in the two laſt caſes a rook muſt be loſt at leaſt for a worſe piece. 9. The player ſhould take care that no guarded pawn of the adverſary's fork two of his pieces. 10. As ſoon as the kings have caſtled on different ſides of the board, the pawns on that ſide of the board ſhould be advanced upon the adverſary's king, and the pieces, eſpecially the queen and rook, ſhould be brought to ſupport them; and the three pawns belonging to the king that is caſtled muſt not be moved. 11. The more moves a player can have in ambuſcade, the better; that is to ſay, the queen, biſhop, or rook, is to be placed behind a pawn or a piece in ſuch a poſition, that, upon playing that pawn or piece a check is diſcovered upon the adverſary's king, by which means a piece of ſome advantage is often gained. 12. An inferior piece ſhould never be guarded with a ſuperior, when a pawn ſhould anſwer the ſame purpoſe: for this reaſon, the ſuperior piece may remain out of play; neither ſhould a pawn be guarded with a piece, when a pawn would do as well. 13. A well ſupported pawn that is paſſed often coſts the adverſary a piece; and when a pawn or any other advantage is gained, without endangering the loſs of the move, the player ſhould make as frequent exchanges of pieces as he can. The advantage of a paſſed pawn is this: for example, if the player and his adverſary have each three pawns upon the board, and no piece, and the player has one of his pawns on one ſide of the board, and the other two on the other ſide, and the adverſary's three pawns are oppoſite to the player's two pawns; he ſhould march with his king as ſoon as he can, and take the adverſary's pawns: If the adverſary goes with his king to ſupport them, the player ſhould go on *to queen* with his ſingle pawns; and then if the adverſary goes to hinder him, he ſhould take the adverſary's pawns, and move the others to queen. (*To queen* is to make a queen, that is, to move a pawn into the adverſary's back row, which is the rule, when the original one is loſt.) 14. When the game is near finiſhed, each party having only 3 or 4 pawns on each ſide of the board, the kings muſt endeavour to gain the move in order to win the game. For inſtance, when the player brings his king oppoſite to the adverſary's with only one ſquare between, he will gain the move. 15. If the adverſary has his king and one pawn on the board, and the player has only his king, he cannot loſe the game, provided he bring his king oppoſite to the adverſary's, when the adverſary is directly before or on one ſide of his pawn, and there is only one ſquare between the kings. 16. If the adverſary has a biſhop and one pawn on the rook's line, and this biſhop is not of the colour that commands the corner ſquare the pawn is going to, and the player has only his king, if he can get into that corner, he cannot loſe; but, on the contrary, may win by *a ſtale*, *i. e.* when the king is blocked up, ſo as to have no move at all. 17. If the player has greatly the diſadvantage of the game, having only his queen left in play, and his king happens to be in a poſition to win, as above mentioned, he ſhould keep giving check to the adverſary's king, always taking care not to check him where he can interpoſe any of his pieces that make the ſtale; by ſo doing he will at laſt force the adverſary to take his queen, and then he will win the game by being in a ſtale-mate. 18. The player ſhould never cover a check with a piece that a pawn puſhed upon it may take, for fear of getting only the pawn in exchange for the piece. 19. A player ſhould never crowd his adverſary up with pieces, for fear of giving a ſtale-mate inadvertently, but always ſhould leave room for his king to move.

(7.) Chess, laws of the game of. I. If a player touches his man, he muſt play it, and if he quits it, he cannot recal it. II. If by miſtake or otherwiſe a falſe move is played, and the adverſary takes no notice of it till he hath played his next move, it cannot be recalled by either of the parties. III. If a player miſplaces the men, and he plays two moves, it is at the option of the adverſary to permit him to begin the game or not. IV. If the adverſary plays or diſcovers a check to a player's king, and gives no notice of it, the player may let him ſtand ſtill till he does. V. After the king is moved, a player cannot caſtle.

(8.) Chess, origin of the game of. As to the origin of the game at cheſs, we are much in the dark. Though it came to us from the Saracens, it is not probable that they were the original inventors of it. According to ſome, it was invented by the celebrated Grecian hero, Palamedes. Others ſay, that two Grecian brothers, Ledo and Tyrrheno, were the inventors; and that being much preſſed with hunger, they ſought to alleviate the pain by this amuſement. It is certain, that it is a game of very ancient ſtanding. (ſee § 9.) and in former ages has been very faſhionable in every part of Europe; though in this country it is not now very common, probably on account of the intenſe application of thought required to play at it. It has long been a favourite amuſement of the Icelanders and other northern people. There is little difference between their game and ours.

(9.) Chess, origin of the name of. Saraſin wrote a treatiſe on the different opinions of the origin of the Latin *ſchacchi*; whence the French *echecs*, and our *cheſs*, is formed. Menage is alſo very full on the ſame head. Leunclavius takes it to come from the *Uſcoches*, famous Turkiſh robbers: P. Sirmond from the German *ſcackle*, theft; and that from *calculus*. He takes *cheſs* to be the ſame with *ludus latrunculorum* of the Romans, but is miſtaken. This opinion is countenanced by Voſſius and Salmaſius, who derived the word from *calculus*, as uſed for *latrunculus*. G. Toloſanus derives it from the Hebrew שיג, *ſejeg*, *ſepe*, whence *vallare*, *vallavit*; and מות, *mat*, *mori*, *mortuus*; others again from שחק, *ſchach*, *luſus*, and מות, *mori*; whence *check* and *check-mate*. Fabricius ſays, Schatrenſcha, a celebrated Perſian aſtronomer, invented the game of *cheſs*; and gave it his own name, which it ſtill bears in that country. Nicod derives it from *ſcheque*, or *xeque*, a Mooriſh word for lord, king, and prince: Bochart adds, that *ſchach* is originally Perſian, and that *ſchachmat*, in that language, ſignifies the *king is dead*. Theſe opinions ſeem to be the moſt probable, and are adopted as ſuch by Scriverius. But the learned Hyde has ſhewn, from undoubted authorities, that this game was firſt invented in India, and paſſed from thence to Perſia before A. D. 576, and from Perſia to Arabia. He adds that the antiquity of this game is traced to the middle of the 2d century in an Iriſh chronicle. And he ſhews, that *ſhah*, i. e. *rex*, was a term much in uſe among the orientals, whilſt engaged in the play, and that they uſed it to caution the king againſt any danger: and hence the Europeans and others have denominated the game *ſhachiludium*, and *ſhahiludium*, and in Engliſh *cheſs*, from this circumſtance. He alſo derives the word *mat* from the Perſic *manit*, *laſſatus eſt*; and ſays, that it was uſed in play, when any of the men was fixed in its place, or taken captive.

* CHESS-APPLE. *n. ſ.* A ſpecies of Wild Service. See Crataegus.

* CHESS-BOARD. *n. ſ.* [from *cheſs* and *board*] The board or table on which the game of cheſs is played —

> And cards are dealt, and *cheſsboards* brought
> To eaſe the pain of coward thought. *Prior.*

* CHESS-MAN. *n. ſ.* [from *cheſs* and *man*.] A puppet for cheſs.—A company of *cheſsmen*, ſtanding

ing on the ſame ſquares of the cheſsboard where we left them: we ſay, they are all in the ſame place, or unmoved. *Locke.*

* CHESSOM. *n. ſ.* Mellow earth.—The tender *cheſſom* and mellow earth is the beſt, being mere mould, between the two extremes of clay and ſand; eſpecially if it be not loamy and binding. *Bacon.*

* CHESS-PLAYER. *n. ſ.* [from *cheſs* and *player.*] A gameſter at cheſs.—Thus, like a ſkilful *cheſs player*, he draws out his men, and makes his pawns of uſe to his greater perſons. *Dryden.*

CHESS-TREES, two pieces of wood bolted perpendicularly, one on the ſtarboard, and another on the larboard, ſide of the ſhip. They are uſed to confine the *clue*, or lower corners of the main-ſail. For this purpoſe there is a hole in the upper part, through which the rope paſſes, that uſually extends the clue of the ſail to windward. See TACK. The cheſs-trees are commonly placed as far before the main maſt, as the length of the main beam.

(1.) * CHEST. *n. ſ.* [*cyſt*, Sax. *ciſta*, Lat.] 1. A box of wood or other materials, in which things are laid up.—He will ſeek there, on my word: neither preſs, *cheſt*, trunk, well, vault, but he hath an abſtract for the remembrance of ſuch places. *Shakeſpeare.* 2. A CHEST *of Drawers.* A caſe with moveable boxes or drawers. 3. The trunk of the body, or cavity from the ſhoulders to the belly.—Such as have round faces, or broad *cheſts*, or ſhoulders, have ſeldom or never long necks. *Brown.*

(2.) CHEST, in commerce, a kind of meaſure, containing an uncertain quantity of ſeveral commodities. A cheſt of ſugar, *e. g.* contains from 10 to 15 hundred weight; a cheſt of glaſs, from 200 to 300 feet; of Caſtile ſoap, from 2½ to 3 hundred weight; of indigo, from 1½ to 2 hundred weight, five ſcore to the hundred.

(3.) CHEST, or THORAX. See ANATOMY, *Index.*

* *To* CHEST. *v. a.* [from the noun.] To repoſite in a cheſt; to hoard.

* CHESTED. *adj.* [from *cheſt*.] Having a cheſt; as, broad-cheſted, narrow-cheſted.

(1.) CHESTER, an ancient and populous city of England, the capital of Cheſhire, commonly called WEST CHESTER. It was a conſiderable time the ſtation of the 20th Roman legion, the command of which was given to Julius Agricola, by the emperor Veſpaſian; and the caſtle, which is a noble ſtructure, has a tower aſcribed to Julius Cæſar, and bearing his name, which, as well as its workmanſhip, prove it to have been originally built by the Romans, though the preſent walls are evidently Norman. It was among the laſt places the Romans quitted; and the Britons maintained their liberty in it, long after the Saxons had got poſſeſſion of the reſt of their country. Cheſter is at preſent a large well built wealthy city, and carries on a conſiderable trade. Mr Pennant calls it "a city without parallel," on account of the ſingular ſtructure of the four principal ſtreets. They are as if excavated out of the earth, and ſunk many feet beneath the ſurface: the carriages drive far beneath the level of the kitchens on a line with ranges of ſhops. The houſes have galleries, piazzas, and covered walls before
them; by which not only the ſhops, but
are walking about the town, are ſo hid
would imagine there were ſcarce any i
in it, though it is very populous. The b
of all the houſes are on a level with th
but to go into any of the 4 principal ſt
neceſſary to deſcend a flight of ſeveral ſt
city is ſquare and ſurrounded by a w
two miles in circumference; it contai
churches, a Roman Catholic chapel, a
ces of worſhip for diſſenters of differe
ſions. It is governed by a mayor, re
dermen, ſheriffs, common-council me
has a fine bridge of 12 arches over the
communication with the inland naviga
channel of 10 miles long, through whic
ſels come up to the quay. It has a con
courſe with Ireland by its packets.
fairs, on Feb. 24, July 5, and Oct. 1
moſt noted in England, eſpecially for h
They laſt a week each. Its markets a
Wedneſ. and Sat. Cheſter is a biſhop
was anciently part of the dioceſe of
one of whoſe biſhops removing the ſeat o
ther, A. D. 1075, his ſucceſſors came to b
ly ſtyled biſhops of Cheſter. But it was
ed into a diſtinct biſhoprick until the g
ſolution of monaſteries, when K. Hen
1541, raiſed it to this dignity, and a
church of the abbey of St Werburg for
dral, adding the biſhoprick to the p
Canterbury: but ſoon after he disjoin
Canterbury, and added it to York.
abbey was diſſolved, its revenues were
L. 1003 : 5 : 11. This dioceſe extends
tire counties of Cheſter and Lancaſte
the counties of Weſtmoreland, Cumbe
Yorkſhire; two chapelries in Denbigh
five pariſhes in Flintſhire; amounting i
pariſhes, of which 101 are impropriati
biſhopric is valued in the king's
L. 420 : 1 : 8, and is computed to be
nually L. 2700; the clergy's tenth am
L. 435 : 12 : 0. To this cathedral belo
two archdeacons, a chancellor, a tre
prebendaries, and other inferior office
vants. The population of this city, wit
urbs, is eſtimated at 15,000; who ſend
ſentatives to parliament. Cheſter is
NW. of London. Lon. 3. 3. W. Lat.

(2.) CHESTER, a county of South C
Pinkney diſtrict; bounded on the E. b
diſtrict; on the N. by York county; c
by Union; and on the S. by Fairfield
Camden diſtrict. It is 40 miles from
and 23 from N. to S. and contains 5,8
habitants, and 938 ſlaves. It is well
Fiſhing, Rocky, and Sandy, creeks.
are rich and well cultivated.

(3.) CHESTER, a navigable river of t
States, in the Eaſtern Shore of Marylan
in New Caſtle County, in the State of
runs nearly W. for about 15 miles; t
denly winding SW. by S. falls into t
peak on the NE. ſide of Kent iſland.

(4.) CHESTER, a poſt town of Mary
the capital of Kent county, ſeated on t
of the CHESTER, (N° 3.) about 14 mile

confluence with the Cheſapeak. It contains a church, college, jail, and court houſe. The college is named WASHINGTON, and was incorporated in 1782. It is ſupported by a permanent fund, eſtabliſhed by law, of L.1,250; and is under truſtees.' A county court is held twice, and an orphan's court five times a-year. This town is 37 miles N. of Eaſton, 66 E. by S. of Baltimore, and 77 SW. of Philadelphia; from which it lies in Lon. 0. 57. W. Lat. 30. 12. N.

(5.) **CHESTER**, a poſt town of New Hampſhire, ſituated in Rockingham county, on the S. ſide of a ſmall creek, which unites with ſeveral others, and falls into the Lamprey. It is compactly built, and has a congregational church. This town was incorporated in 1722. It is 6 miles N. of Londonderry; 30 WSW. of Portſmouth; and 394 NE. of Philadelphia; from which it lies in Lon. 3. 47. E. Lat. 42. 56. N.

(6.) **CHESTER**, a populous and well cultivated county of Pennſylvania; 45 miles long and 30 broad. It is bounded on the N. by Berks, on the NE. by Montgomery, on the SE. by Delaware county, and part of the State of Delaware; on the SW. and W. by Lancaſter; and on the S. by Cecil county, in the ſtate of Maryland. It is divided into 33 townſhips. In the northern parts are mines of iron ore; and great quantities of bar iron are manufactured annually. The chief town is WEST CHESTER, N° 21.

(7.) **CHESTER**, a poſt town of Pennſylvania, and capital of the county, N° 6. It is ſituated on the NW. ſide of the Delaware, between Ridgely and Cheſter creek, 15 miles SW. of Philadelphia. It is built on a regular plan, and has a jail and a court-houſe, where quarterly courts are held. This town is remarkable for being the place where the firſt colonial aſſembly was convened, on the 4th Decem. 1682. It was incorporated by an act of the aſſembly, in Dec. 1795, and is governed by two burgeſſes, one high conſtable, a town clerk and three aſſiſtants. The powers of the corporation are much limited: They are wholly confined to the preſervation of peace and order, among the inhabitants of the borough.

(8.) **CHESTER**, a town of Virginia, in Shanandoah county, ſituated between the N. and S. branches of the river Shanandoah, about 13 miles S. of Newton, and 20 S. by W. of Wincheſter. Lon. 3. 22. W. Lat. 39. 2. N. from the meridian of Philadelphia.

(9.) **CHESTER**, a village of England, in Northamptonſhire, near Archeſter.

(10.) **CHESTER**. See CASTLE, N° 4.

(11.) * **CHESTER**. See CASTOR, N° V.

(12.) **CHESTER, BLACK**, a village in Somerſetſhire, NW. of Bruton.

(13.) **CHESTER, EAST**, a townſhip of New York, in the county of WEST CHESTER, N° 19.

(14.) **CHESTER IN THE STREET**, or **CHESTER-LE-STREET**, the CUNEACESTRE of the Saxons, a ſmall thoroughfare town between Newcaſtle and Durham, with a good church and fine ſpire. In the time of the Saxons, this place was greatly reſpected on account of the relics of St Cuthbert, depoſited in it, by biſhop Eardulf, for fear of the Danes, who then (about A. D. 884) ravaged the country. His ſhrine became afterwards an object of great devotion. King Athelſtane, on his expedition to Scotland, paid it a viſit, to obtain ſucceſs on his arms; beſtowed many gifts on the church; and directed, in caſe he died in his enterprize, that his body ſhould be interred there. Along with the remains of St Cuthbert, the biſhopric of Lindesfarn was removed here, and endowed with all the lands between the Tyne and the Were, comprehending the preſent county of Durham. The inhabitants had great privileges, and were free from all military duty, except that of defending the body of their ſaint. Cheſter may be conſidered as the parent of the ſee of Durham; for when the ſaint's relics were removed there, in 995, the ſee followed them. Biſhop Beke, in 1286, in honour of the ſaint, made the church collegiate; eſtabliſhed a dean and ſuitable eccleſiaſtics; and, among other privileges, gave the dean a right of fiſhing on the Were, with the tythes of fiſh. This town is 5 m. N. of Durham.

(15.) **CHESTER IN THE WALL**, a village in Northumberland, near Buſy-Gap.

(16.) **CHESTER, LITTLE**, near Derby.

(17.) **CHESTER, OVER**, a hamlet of Monk's Kirby, in Warwickſhire.

(18.) **CHESTER, WEST**, an old ruinous town near Almonbury in Yorkſhire, anciently called CAMBODUNUM.

(19.) **CHESTER, WEST**, a county of New York, bounded on the N. by Dutcheſs county; on the E. by the ſtate of Connecticut; on the S. by Long Iſland Sound, and New York county; on the W. by the Hudſon, which ſeparates it from Orange county and the ſtate of New Jerſey. It is divided into 21 townſhips, and in 1790, contained 22,584 free inhabitants, and 1,419 ſlaves. Bedford is the chief town.

(20.) **CHESTER, WEST**, a townſhip in the above county, N° 19.

(1.) **CHESTERFIELD**, a county of South Carolina, ſituated in Cheraws diſtrict. It is bounded on the N. by North Carolina; on the W. by Lynch's creek, which ſeparates it from Lancaſter county; on the S. by Cedar creek, which ſeparates it from Darlington county; and on the E. by the Great Pedee river, which divides it from Marlborough. It is about 30 miles long and 29 broad.

(2.) **CHESTERFIELD**, a county of Virginia, 30 miles long and 25 broad; bounded on the N. and NE. by the James, which ſeparates it from Henrico and Charles-city counties; on the S. and SW. by the Appamattox, which ſeparates from Prince George's, Dinwiddie, and Amelia; and on the SW. by Powhatan. It contained 14,214 inhabitants in 1790, of whom 7,487 were ſlaves. A county court is held at the court houſe monthly.

(3.) **CHESTERFIELD**, a market town of England, in Derbyſhire, the ſecond in the county, pleaſantly ſituated on a hill between the Iber and the Rother. It was made a free borough by King John. It is very populous, and has 6 fairs, and a conſiderable market for corn, lead, and other commodities; with ſtocking and carpet manufactories; 4 potteries, and large iron founderies near it. The houſes are moſtly built of rough ſtone, and covered with ſlate. It is 22 m. N. of Derby, and 149 NNW. of London. Lon. 1. 27. W. Lat. 53. 18. N.

(4.) CHESTERFIELD, a village in Staffordſhire, S. of Litchfield, ſeated on the Tame.

(5.) CHESTERFIELD, Earl of. See STANHOPE.

* CHESTFOUNDERING. *n. ſ.* A diſeaſe in horſes. It comes near to a pleuriſy, or peripneumony, in a human body. *Farrier.*

(1.) * CHESTNUT. CHESTNUT-TREE. [*chaſtaigne*, Fr. *caſtanea*, Lat.] 1. The tree hath katkins, which are placed at remote diſtances from the fruit, on the ſame tree. The outer coat of the fruit is very rough, and has 2 or 3 nuts included in each huſk or covering, as may be proved by the old buildings in London, which were for the moſt part, of this timber; which is equal in value to the beſt oak, and, for many purpoſes, far exceeds it, particularly for making veſſels for liquors; it having a property, when once thoroughly ſeaſoned, to maintain its bulk conſtantly, and is not ſubject to ſhrink or ſwell, like other timber. *Miller.* 2. The fruit of the cheſtnut-tree. —October has a baſket of ſervices, medlars and *cheſtnuts*, and fruits that ripen at the latter time. *Peacham.* 3. The name of a brown colour.—

His hair is of a good colour.——
——An excellent colour: your *cheſtnut* was ever the only colour. *Shak.*

(2.) CHESTNUT. See FAGUS.

(3.) CHESTNUT, HORSE. See ÆSCULUS.

(4.) CHESTNUT, INDIAN ROSE. See MESUA.

(5.) * CHESTNUT-TREE. See CHESTNUT, N° 1.

* CHESTON. *n. ſ.* A ſpecies of plum.

CHEVALER, in the manege, is ſaid of a horſe, when, in paſſaging upon a walk or trot, his off fore-leg croſſes or overlaps the near fore-leg every ſecond motion.

(1.) * CHEVALIER. *n. ſ.* [*chevalier*, Fr.] A knight; a gallant ſtrong man.—

Renowned Talbot doth expect my aid;
And I am lowted by a traitor villain,
And cannot help the noble *chevalier*. *Shak.*

(2.) CHEVALIER, in heraldry, ſignifies any CAVALIER, or horſeman armed at all points; now out of uſe, and only to be ſeen in coat armour.

(1.) * CHEVAUX DE FRISE. *n. ſ.* [Fr. The ſingular *Cheval de Friſe* is ſeldom uſed.] The Frieſland horſe, which is a piece of timber, larger or ſmaller, pierced and traverſed with wooden ſpikes pointed with iron, 5 or 6 feet long; uſed for defending a paſſage, ſtopping a breach, or making a retrenchment to ſtop the cavalry. It is alſo called a turnpike, or tourniquet. *Chamb.*

(2.) CHEVAUX DE FRISE are ſometimes mounted on wheels, with artificial fires, to roll down in an aſſault. Errard obſerves, that the prince of Orange uſed to incloſe his camp with *Chevaux de Friſe*, placing them one over another. See *Plate* LXV. *fig* 9.

* CHEVEN. *n. ſ.* [*chevesne*, Fr.] A river fiſh; the ſame with chub.

CHEVENING, a pariſh of England, in Kent, 3 miles from Seven-Oaks.

* CHEVERIL. *n. ſ.* [*chevrau*, Fr.] A kid; kidleather. Obſolete.—A ſentence is but a *cheveril* glove to a good wit: how quickly the wrong ſide may be turned outward. *Shak.*

CHEVIOT, or TIVIOT HILLS, a ridge of mountains, which run from N. to S. through Northumberland and Cumberland, near which was a free chace, called Cheviot, corruptly *Chevy-chace*; the ſeat of the encounter between the Piercies and Douglaſſes, celebrated in the ancient popular ballad of *Chevy-chace*. It lay 6 miles from the borders of Scotland, and 18 S. of Berwick. Theſe hills are the firſt land diſcovered by ſailors in coming from the eaſt into Scotland. One of them is ſo high, that it is ſeen 60 miles off. Theſe hills are famous for feeding an excellent breed of ſheep, called from them the CHEVIOT BREED. See SHEEP.

(1.) * CHEVISANCE. *n. ſ.* [*cheviſance*, Fr.] Enterpriſe; atchievement. A word now not in uſe.—

Fortune, the foe of famous *cheviſance*,
Seldom, ſaid Guyon, yields to virtue aid. *Spenſ.*

(2.) CHEVISANCE, in law, denotes an agreement or compoſition, as an end or order ſet down between a creditor and his debtor, &c. In the ſtatutes, this word is moſt commonly uſed for an unlawful bargain or contract,

CHEVISIA, or
CHEVITIÆ, } [Old law Lat.] Heads of plowed lands.

CHEVREAU, Urban, a learned writer, born at London, in 1613. He diſtinguiſhed himſelf in his youth by his knowledge of the belles lettres; and became ſecretary of ſtate to queen Chriſtina of Sweden. Several German princes invited him to their courts; and Charles-Lewis, the elector palatine, retained him under the title of counſellor. After the death of that prince, he returned to France, and became preceptor to the duke of Maine. He died at London, in 1701, aged 88. He wrote ſeveral books, particularly an Univerſal Hiſtory, which has often been reprinted.

CHEVREGNY, a town of France, in the dep. of the Aiſne, and chief place of a canton, in the diſtrict of Laon, 5 miles S. of Laon.

CHEVREUSE, a town of France, in the dep. of the Seine and Oiſe, and chief place of a canton, in the diſtrict of Verſailles; 8 miles SW. of Verſailles.

* CHEVRON. *n. ſ.* [French.] One of the honourable ordinaries in heraldry. It repreſents two rafters of a houſe, ſet up as they ought to ſtand. *Harris.*

CHEVRONEL, the half of a chevron.

CHEVRONNE, or
CHEVRONNY, } in heraldry, the parting of a ſhield ſeveral times.

CHEUX, a town of France, in the dep. of Calvados, and chief place of a canton, in the diſtrict of Caen; 6 miles W. of Caen.

(1.) * *To* CHEW. *v. a.* [*ceouyan*, Sax. *kauwen*, Dutch. It is very frequently pronounced *chaw*, and perhaps properly.] 1. To grind with the teeth; to maſticate.—By *chewing*, ſolid aliment is divided into ſmall parts; in a human body, there is no other inſtrument to perform this action but the teeth. By the action of *chewing* the ſpittle and mucus are ſqueezed from the glands, and mixed with the aliment; which action, if it be long continued, will turn the aliment into a ſort of chyle. *Arbuthnot.* 2. To meditate; or ruminate in the thoughts.—

While the fierce monk does at this trial ſtand,
He *chews* revenge, abjuring his offence:
Guile in his tongue, and murder in his hand,
He ſtabs his judge, to prove his innocence. *Prior.*

1. To taſte without ſwallowing.—Some books are to be taſted, others to be ſwallowed, and ſome few to be *chewed* and digeſted; that is, ſome books are to be read only in parts; others to be read, but not curiouſly; and ſome few to be read wholly, with attention. *Bacon.*

(2.) * *To* CHEW. *v. n.* To champ upon; to ruminate.—Inculcate the doctrine of diſobedience, and then leave the multitude to *chew* upon't. *L'Eſtrange.*

CHEWASE, a town of the United States of America, in Tenneſſee, 24 miles SW. of Tellico.

CHEWING BALLS, a kind of balls made of aſafœtida, liver of antimony, bay wood, juniper wood, and pellitory of Spain; which being dried in the ſun, and wrapped in a linen cloth, are tied to the bit of the bridle for the horſe to chew. They create an appetite; and it is ſaid that balls of Venice treacle may be uſed in the ſame manner with ſucceſs.

CHEYKS, a ſet of licenſed plunderers in the Eaſt Indies. See BENGAL, § 9.

CHEYNE, Dr George, a phyſician of great learning and abilities, born in the pariſh of Methlick in Aberdeenſhire, in 1671; and educated at Edinburgh under the famous Dr Pitcairn. He paſſed his youth in cloſe ſtudy, and with great temperance: but coming to ſettle at London, when about 30, and finding the younger gentry and free livers to be the moſt eaſy of acceſs and moſt ſuſceptible of friendſhip, he changed on a ſudden his former manner of living, in order to force a trade, having obſerved this method to ſucceed with ſome others. The conſequence was, that he grew daily in bulk; and ſwelled to ſuch an enormous ſize, that he exceeded 32 ſtone weight; and was forced to have the whole ſide of his chariot made open to receive him; he grew ſhort breathed, lethargic, nervous, and ſcorbutic; ſo that his life became an intolerable burden. In this deplorable condition, after having tried all the power of medicine in vain, he reſolved to try a milk and vegetable diet; the good effects of which quickly appeared. His ſize was reduced almoſt a third; and he recovered his ſtrength, activity, and cheerfulneſs, with the perfect uſe of all his faculties. In ſhort, by a regular adherence to this regimen, he lived to a mature period, dying at Bath in 1742, aged 72. He wrote ſeveral treatiſes that were well received; particularly, "An Eſſay on Health and Long Life;" and "The Engliſh Malady, or a Treatiſe of Nervous Diſeaſes;" both the reſult of his own experience. In ſhort, he had great reputation in his own time, both as a practitioner and as a writer; and moſt of his pieces paſſed through ſeveral editions.

CHEZIB, or ACHAZIB. See ACHAZIB.

CHIABRERA, Gabriel, eſteemed the Pindar of Italy, was born at Savonna in 1552, and went to ſtudy at Rome. The Italian princes, and Urban VIII. gave him public marks of their eſteem. He wrote a great number of poems; but his lyric verſes are moſt admired. He died at Savona in 1638, aged 36.

(1.) CHIAMETLAN, a maritime province of N. America, in Mexico; bounded on the N. by Culiacan, on the E. by Zacatecas, on the S. by Xalaſco, and on the W. by the Pacific Ocean. The ſoil is fertile, and many mines of ſilver are found in the country. St Sebaſtian is the capital.

(2.) CHIAMETLAN, a town of Mexico, in the above province; 325 miles NW. of Mexico. Lon. 87. 15. W. Ferro. Lat. 23. 40. N.

(3.) CHIAMETLAN ISLANDS, a cluſter of ſmall iſlands in the Pacific ocean, near the coaſt of Mexico. Lon. 86. 40. W. Ferro. Lat. 22. 20. N.

CHIAMPA, a country of Aſia, bounded on the N. by the deſert of Cochin-china, on the E. and S. by the Indian Sea, and on the W. by Cambodia. It is little known.

CHIAMPO, a river of Italy, in the late Auſtrian province of Vicentino.

CHIANA, a river of Italy, which joins the Tiber, about 10 miles S. of Orvieto.

CHIAN EARTH, in pharmacy, one of the medicinal earths of the ancients, the name of which is preſerved in the catalogues of the materia medica, but of which little more than the name has been known for many ages in the ſhops. It is a very denſe and compact earth; and is ſent in ſmall flat pieces from the iſland of Chios, in which it is found in great plenty. It is recommended as an aſtringent; and as the greateſt of all coſmetics; and that it gives a whiteneſs and ſmoothneſs to the ſkin, and prevents wrinkles, beyond any ſubſtances that have been celebrated for theſe properties.

CHIANG, a mountain in Ruſſian Tartary.

CHIANNI, a town of Italy, in Tuſcany, 16 miles SSE. of Leghorn.

CHIANTLA, a town of Mexico, in the province of Chiapa; 100 miles SE. of Chiapa dos Eſpagnols.

(1.) CHIAOUS, (in the original Turkiſh, ENVOYS,) are officers to the number of 500 or 600 in the grand ſignior's court, under the command of a chiaous baſchi. They frequently meet in the grand viſir's palace, that they may be in readineſs to execute his orders, and carry his diſpatches into all the provinces of the empire.

(2.) CHIAOUS BASCHI aſſiſts at the divan, and introduces thoſe who have buſineſs there.

(1.) CHIAPA, a province of North America, in the country of Mexico, and audience of Guatimala; bounded on the N. by the province of Tabaſco; on the E. by Vera Paz; on the S. by Guatimala; on the SW. by Sonuſco; and on the W. by Guaxaca. It is 70 leagues long, and 65 broad. Its principal productions are grain and fruits, with excellent paſtures, on which they feed a great number of cattle. Its horſes are ſo valuable that they are ſent to Mexico, 500 miles diſtance. There are no mines of gold or ſilver.

(2.) CHIAPA DOS ESPAGNOLS, or CIVIDAD REAL, a town in the above province, and the ſee of a biſhop. It contains only one pariſh, with three convents, and about 400 Spaniſh families, with a fauxbourg, containing about 100 Indian families. Its principal commerce is in cocoa, cotton, and cochineal. It is 380 miles SE. of Mexico. Lon. 76. 50. W. Ferro. Lon. 17. 0. N.

(5.) CHIAPA, or CHIAPA DOS INDIOS, a town of North America, in the province of Chiapa, containing about 4000 families, chiefly Indians, who are rich. During the day the heat here is violent, while the nights are cool. The inhabitants raiſe a great deal of ſugar. It is 350 miles SE. of Mexico, and 30 W. of Chiapa dos Eſpagnols.

CHIARASCO. See CHERASCO.

(1.) CHIARENZA, or CLARENZA, a territory in the NW. coaſt of the Morea, ſubject to the Turks, anciently called ACHAIA.

(2.) CHIARENZA, the capital of the above territory, and a ſea port in the Mediterranean, oppoſite to the iſle of Zante. It has a good harbour, and is 36 miles S. of Patros. Lon. 21. 35. E. Lat 37. 10. N.

(1.) CHIARI, a town of Italy, in the ci-devant province of Breſciano; between Breſcia and Crema, where the Imperialiſts obtained a victory over the French in 1701. It is 7 miles W. of Breſcia, and 27 E. of Milan. Lon. 10. 17. E. Lat. 45. 30. N.

(2.) CHIARI, or CHIARE, a town of Italy, in the dep. of Benaco, in a diſtrict of the ſame name. The inhabitants of the town and diſtrict amount to about 9000.

(3.) CHIARI, Joſeph, a celebrated Italian painter, was the diſciple of Carlo Maratti; and adorned the churches and palaces of Rome with a great number of fine paintings. He died of an apoplexy, in 1727, aged 73.

(1.) CHIARO-MONTE, a mountain of Sicily, near the valley of Noto.

(2.) CHIARO-MONTE, a town ſeated on the above mountain, 25 miles W. of Syracuſe. Lon. 14. 59. E. Lat. 37. 3. N.

CHIAVE, [Ital. a key,] in muſic, a clef.

(1.) CHIAVENNA, a county of Switzerland, which was under the government of the Griſons, till 1797, when it was formally united to the Ciſalpine (afterwards the Italian) republic, in conſequence of the deciſion of Gen. Bonaparte, as arbiter between the people of theſe territories and the Griſons. It is ſituated at the foot of the Rhetian Alps, to the N. of the lake of Como; is about 8 leagues long and 6 broad; and now, it is ſuppoſed, forms part of the new kingdom of Italy. The country is for the moſt part fertile in wine and paſtures; and the inhabitants pay conſiderable attention to the production of ſilk. Of this commodity it is eſtimated that the county yields 3600 lb. annually; and though there is generally a deficiency of corn for the wants of the inhabitants, they are ſupplied by their neighbours for cattle, wine, and ſilk.

(2.) CHIAVENNA, a lake in the above county, near the town (N° 3.) The views from this lake are extremely magnificent and romantic, as it is ſurrounded with numerous craggy rocks riſing into ſpires above each other, ſprinkled with ſnow. The baſes of theſe precipices are hid in the dead and overſhadowed water; which is doubly dangerous, both by its malignant vapours and the frequent ſtorms to which it is ſubject; and the more ſo, that its ſhores ſcarce afford any aſylum to the crews of the frail boats that ſail upon it.

(3.) CHIAVENNA, the chief town in the above county, is ſituated at the foot of a mountain, and contains about 3000 ſouls. Its chief ſupport is the tranſport of merchandize, being the principal communication between the Milaneſe and Germany. From this town the goods are ſent either by Coire into Germany, or through Pregalia and the Engandinas into the Tyrol. Beſides which, it is a place of very little trade: the chief articles of exportation are ſtone pots, called *lavezzi*, and raw ſilk. The only manufacture carried on in the town is that of ſilk ſtockings; and this is but a late eſtabliſhment. The neighbouring country is covered with vineyards; but the wine is of a meagre ſort, and only a ſmall quantity is exported. On the ſummit of a rock which overlooks the town, ſtand the ruins of a fortreſs, celebrated in the hiſtory of the Griſons for its almoſt impregnable ſtrength. Chiavenna is 38 miles N. of Como, and 35 S. of Coire. Lon. 9. 19. E. Lat. 46. 19. N.

CHIAUSI, among the Turks, officers employed in executing the vizirs, baſhaws, and other great men: the orders for doing this, the grand ſignior ſends them wrapped up in a black cloth; on the reception of which, they immediately perform their office.

* CHICANE. *n. ſ.* [*chicane*, Fr. derived by *Menage* from the Spaniſh word *chico*, little.] 1. The art of protracting a conteſt by petty objections and artifice.—His attornies have hardly one trick left; they are at an end of all their *chicane*. *Arbuthnot.* 2. Artifice in general. This ſenſe is only in familiar language.—

Unwilling then in arms to meet,
He ſtrove to lengthen the campaign,
And ſave his forces by *chicane*. *Prior.*

* *To* CHICANE. *v. n.* [*chicaner*, Fr.] To prolong a conteſt by tricks.

* CHICANER. *n. ſ.* [*chicaneur*, Fr.] A petty ſophiſter; a trifling diſputant; a wrangler.—This is the way to diſtinguiſh the two moſt different things I know, a logical *chicaner* from a man of reaſon. *Locke.*

* CHICANERY. *n. ſ.* [*chicanerie*, Fr.] Sophiſtry; mean arts of wrangle.—His anger cauſed him to deſtroy the greateſt part of theſe reports; and only to preſerve ſuch as diſcovered moſt of the *chicanery* and futility of the practice. *Arbuthnot.*

CHICANGA, or CHACANGA, a kingdom of Africa, which was formerly a part of the country of Monomotapa; it is rich in gold mines. It is ſometimes called *Manica*, from the principal town, which is ſituated on the river Sofala, in Lon. 28. 0. E. Greenwich. Lat. 20. 15. S.

CHICAPEE, or CHICKABEE, a ſmall river of the United States, in Maſſachuſetts, which riſes from ſeveral ponds in Worceſter county, and after running a SW. courſe, unites with the Ware, about 6 miles before it approaches the Connecticut.

CHICACOTTAH, a fortified town on the S. frontier of Bootan, frequently taken and relinquiſhed by the Britiſh India troops in the war with the Booteeas in 1772. It is 94 miles S. of Tarſaſuddon. Lon. 89. 35. E. Lat. 26. 35. N.

CHICHAR, [ככר, Heb.] a talent of gold, worth L.4500 Sterling, or of ſilver worth L.375.

CHICHE, a town of France, in the dep. of the Two Sevres, and chief place of a canton, in the diſtrict of Chatillon ſur Sevre: 6 miles SE. of Breſſuire.

* **CHICHES.** *n. ſ.* See **Chickpeas.**

(1.) **CHICHESTER**, a city of England, and the capital of the county of Suſſex, ſituated on the river Lavant, about 5 miles above its junction with an arm of the ſea. This city is ſaid to have been built by Ciſſa, the ſecond king of the South Saxons, and by him called *Ciſſan Caeſter;* and to have been the reſidence of his ſucceſſors; but the Roman pavement and other circumſtances, ſhow it to have been more ancient, and at leaſt known to the Romans. It was walled round, and furniſhed with 4 gates, which are now pulled down. Four principal ſtreets extend from the centre, with the names Eaſt, Weſt, North, and South, from their direction. The river almoſt ſurrounds the town; but the water is too ſhallow to admit ſhips of burden ſo high up, and they are obliged to unload 2 miles below. An act of parliament was obtained in the reign of James I. to make the Lavant navigable up to the city, but this was not put in execution. The branch or arm of the ſea into which the river falls, is ſpacious, well ſheltered, and capable of receiving ſhips of great burden. Many of its banks are ſteep, where wharfs or warehouſes might be erected at a ſmall expenſe. The channel is not difficult, but there are ſand-banks off the mouth of the harbour, which render it impoſſible for ſhips of heavy burden to come in, unleſs at ſpring tides. Merchant veſſels are frequently built and repaired here, and ſometimes ſhips of war. The city is a corporation, and is governed by a mayor, recorder, aldermen, and common council without limitation, and 4 juſtices of the peace choſen out of the aldermen; and it ſends two members to parliament. It has been long noted for the manufacture of needles; and a manufacture of baize, blankets, and coarſe cloths, has lately been eſtabliſhed. Two markets are held weekly, on Wedneſday and Saturday, for corn and proviſions; and on every other Wedneſday a market for live ſheep and cattle. Chicheſter is the ſee of a biſhop, and has five pariſh churches. The cathedral church was anciently dedicated to St Peter. It was new built by Radulph, the 25th biſhop; but being deſtroyed by fire, it was again built by Seffridus II. the 29th biſhop. This ſee hath yielded to the church two ſaints, and to the nation three lord chancellors, two almoners, and one chancellor to the univerſity of Oxford. Anciently the biſhops of Chicheſter were confeſſors to the queens of England. This dioceſe contains the whole of the county of Suſſex (excepting 22 pariſhes, peculiars of the abp. of Canterbury), wherein are 250 pariſhes, of which 112 are impropriated. It has two archdeacons, viz. of Chicheſter and Lewis; is valued in the king's books at L. 677 : 1 : 3, and is computed to be worth annually L. 2600. The tenths of the whole clergy is L. 287 : 2 : 0¼. To the cathedral belong a biſhop, a dean, two archdeacons, a treaſurer, 32 prebendaries, a chanter, 12 vicars choral, and other officers. Chicheſter is 21 miles SE. of Wincheſter, and 61 SSW. of London. Lon. 0. 48. W. Lat. 50. 50. N.

(2.) Chicheſter, a ſea port town of Pennſylvania, ſeated on the Delaware below Cheſter.

(3.) Chicheſter, a townſhip of New Hampſhire, in Rockingham county, containing 491 ſouls.

* **CHICHLING** vetch. *n. ſ.* [*lathyrus*, Lat.] In Germany they are cultivated, and eaten as peas, though neither ſo tender nor well taſted. *Miller.*

(1.) * **CHICK.** Chicken. *n. ſ.* [*cicen*, Sax. *kiecken*, Dutch. *Chicken* is, I believe the old plural of *chick*, though now uſed as a ſingular noun.] 1. The young of a bird, particularly of a hen, or ſmall bird.—Having the notion that one laid the egg out of which the other was hatched, I have a clear idea of the relation of dam and *chick.* *Locke.*

> On rainy days alone I dine,
> Upon a *chick* and pint of wine:
> On rainy days I dine alone,
> And pick my *chicken* to the bone. *Swift.*

2. A word of tenderneſs.—

> My Ariel, *chick*,
> This is thy charge. *Shak.*

3. A term for a young girl.—

> Then, Chloe, ſtill go on to prate
> Of thirty-ſix and thirty-eight;
> Purſue your trade of ſcandal picking,
> Your hints, that Stella is no *chicken.* *Swift.*

(2.) Chick, or Chicken. See Phasianus.

CHICKAHOMINY, a ſmall navigable river of Virginia, which riſes in Goochland county, and running a SE. courſe, and afterwards S. falls into the James at Sandy Point. It is navigable for veſſels of 6 tons, about 32 miles.

CHICKASAWS, a nation of American Indians, who inhabit the country E. of the Miſſiſippi, in the NW. corner of Georgia. They have 7 towns, and are eſtimated at about 1700 ſouls. Of theſe 500 are warriors. Their country is an extenſive plain; bounded on the W. by the Miſſiſippi; on the E. by the river Tombeckbee; on the N. by Kentucky, and on the S. by the Chacktaw Indians. The ſoil is rich, and the land well cultivated. The chief town is in Lon. 89. 30. W. Lat. 34. 23. N.

* **CHICKENHEARTED.** *adj.* [from *chicken*, and *heart.*] Cowardly; timorous; fearful.—

> Now we ſet up for tilting in the pit,
> Where 'tis agreed by bullies, *chickenhearted*,
> To fright the ladies firſt and then be parted.
> *Prologue to Spaniſh Fryar.*

The **CHICKENPOX.** *n. ſ.* An exanthematous diſtemper, ſo called from its being of no very great danger. See Medicine, *Index.*

* **CHICKLING.** *n. ſ.* [from *chick.*] A ſmall chicken.

Chickling pea, or Chickling vetch, in botany. See Lathyrus.

CHICKPEAS. *n. ſ.* [from *chick* and *pea.*] A kind of degenerate pea. *Miller.* See Cicer.

CHICKWEED. *n. ſ.* [from *chick* and *weed.*] The name of a plant.—Green mint, or *chickweed*, are of good uſe, in all the hard ſwellings of the breaſt, occaſioned by milk. *Wiſeman.* See Alsine.

CHICUITOS, or Cuyo, a province of S. America, in the government of Santa-Cruz de la Sierra. Its chief riches conſiſt of honey and wax; and the original inhabitants are very voluptuous, yet very warlike. They maintained bloody wars with the Spaniards till 1690; ſince which, ſome of them have become Chriſtians. It is bounded by the Plata on the NE. and by Chili on the W.

(1.) CHIDDINGFORD, a village in Devonſh. near S. Moulton.

(2.) Chiddingford, a town in Suſſex, which has a market every Wed. and Sat. It is 41 miles from London.

(1.) * *To* CHIDE. *v. a.* preter. *chid* or *chode*, part. *chid* or *chidden*. [*cidan*, Sax.] 1. To reprove; to check; to correct with words: applied to perſons.—

Chide him for faults, and do it reverently,
When you perceive his blood inclin'd to mirth.
Shakeſpeare.
And fly like *chidden* Mercury from Jove. *Shak.*
Margaret my queen, and Clifford too,
Have *chid* me from the battle. *Shakeſpeare.*

3. To blame; to reproach; applied to things.—

I *chid* the folly of my thoughtleſs haſte;
For, the work perfected, the joy was paſt. *Prior.*

(2.) * *To* Chide. *v. n.* 1. To clamour; to ſcold.—

What had he to do to *chide* at me? *Shakeſp.*
Next morn, betimes, the bride was miſſing:
The mother ſcream'd, the father *chid*,
Where can this idle wench be hid? *Swift.*

2. To quarrel with.—

The buſineſs of the ſtate does him offence,
And he does *chide* with you. *Shakeſp.*

3. To make a noiſe.—

My duty,
As doth a rock againſt the *chiding* flood,
Should the approach of this wild river break,
And ſtand unſhaken yours. *Shakeſp.*

* CHIDER. *n. ſ.* [from *chide.*] A rebuker; a reprover.—I love no *chider*, ſir. *Shak.*

CHIDLEY. See Chimleigh.

(1.) * CHIEF. *adj.* [*chef*, the head, Fr.] 1. Principal; moſt eminent; above the reſt in any reſpect.—Theſe were the *chief* of the officers that were over Solomon's works. 1 *Kings.*—The hand of the princes and rulers hath been *chief* in this treſpaſs. *Ezra.* 2. Eminent; extraordinary.—A froward man ſoweth ſtrife, and a whiſperer ſeparateth *chief* friends. *Proverbs.* 3. Capital; of the firſt order; that to which other parts are inferior, or ſubordinate.—I came to have a good general view of the apoſtle's main purpoſe in writing the epiſtle, and the *chief* branches of his diſcourſe wherein he proſecuted it. *Locke.* 4. It is uſed by ſome writers with a ſuperlative termination; but, I think, improperly; the comparative *chiefer* is never found.—

We beſeech you, bend you to remain
Here in the cheer and comfort of our eye,
Our *chiefeſt* courtier, couſin, and our ſon. *Shak.*

—Doeg an Edomite, the *chiefeſt* of the herdmen. 1 *Sam.*—He ſometimes denied admiſſion to the *chiefeſt* officers of the army. *Clarendon.*

(2.) * Chief. *n. ſ.* [from the adjective.] 1. A military commander; a leader of armies; a captain.—

A wit's a feather, and a *chief* a rod;
An honeſt man's the nobleſt work of God. *Pope.*
A prudent *chief* not always muſt diſplay
His pow'rs in equal ranks, and fair array;
But with th' occaſion and the place comply,
Conceal his force, nay ſeem ſometimes to fly.
Pope.

2. In Chief, in law. *In capite*, by perſonal ſervice.—All ſums demandable, either for licence of alienation to be made of lands holden in *chief*, or for the pardon of any ſuch alienation already made without licence, have been ſtayed in the way to the hanapar. *Bacon.*—I ſhall be proud to hold my dependance on you in *chief*, as I do part of my ſmall fortune in Wiltſhire. *Dryden.* 3. In *Spenſer* it ſeems to ſignify ſomewhat like atchievement; a mark of diſtinction.—

Where be the noſegays that ſhe dight for thee?
The coloured chaplets wrought with a *chief*,
The knottiſh ruſh rings, and gilt roſemary.
Spenſer.

4. In heraldry.—The *chief* is ſo called of the French word *chef*, the head or upper part: this poſſeſſes the upper third part of the eſcutcheon. *Peacham.*

(3.) Chief, in heraldry, is that which takes up all the upper part of the eſcutcheon from ſide to ſide, and repreſents a man's head. *In* Chief, imports ſomething borne in the chief part or top of the eſcutcheon.

* CHIEFLY. *adv.* [from *chief.*] Principally; eminently; more than common.—Thoſe parts of the kingdom where the number and eſtates of the diſſenters *chiefly* lay. *Swift.*

* CHIEFRIE. *n. ſ.* [from *chief.*] A ſmall rent paid to the lord Paramount.—They ſhall be well able to live upon thoſe lands, to yield her majeſty reaſonable *chiefrie*, and alſo give a competent maintenance unto the garriſons. *Spenſer.*—Would the reſerved rent at this day be any more than a ſmall *chiefrie*? *Swift.*

(1.) * CHIEFTAIN. *n. ſ.* [from *chief*, *n. ſ.* captain.] 1. A leader; a commander.—

That forc'd their *chieftain*, for his ſafety's ſake,
(Their *chieftain* Humber named was aright)
Unto the mighty ſtream him to betake,
Where he an end of battle and of life did make.
Fairy Queen.

2. the head of a clan.—It broke, and abſolutely ſubdued all the lords and *chieftains* of the Iriſhry. *Davis.*

(2.) Chieftain. See Clans.

CHIELEFA, a ſtrong town of Turkey in Europe, in the Morea. It was taken by the Venetians in 1685; but after that the Turks retook it, with all the Morea. Lon. 22. 28. E. Lat. 36. 35. N.

CHIEMSEE, an extenſive lake of Germany, in Bavaria, ſometimes called the ſea of Bavaria. It contains ſeveral iſlands, particularly Herrenwerd and Frawenwerd, the former of which is a biſhop's ſee, and is ſituated 22 miles WSW. of Saltzburg.

CHIERI, a fortified town of Italy, in Piedmont, ſeated on the declivity of a hill, in a pleaſant country, bounded on all ſides by hills covered with vines. It has manufactures of cloth and ſilk; and is ſurrounded by an ancient wall, defended by towers, with a foſſe; and had formerly a fortreſs named *Rochetta*, which was demoliſhed in the 16th century. It has ſix gates and four grand ſquares or palaces, many churches and religious houſes though only two pariſhes within the walls, and one without. Near it, the French defeated the Spaniards in 1639. It is 8 miles E. of Turin. Lon. 7. 45. E. Lat. 44. 50. N.

CHIESA, or Chieſe, two rivers of Italy; 1. runs through the lake Idro, in the department of Benaco, and falls into the Oglio, below Aquanegra; 2. formery called *Bertena*, runs into the Po, at Caneto, in the Mantuan.

CHIETI, a town of Naples, and capital of Abruzzo citerior, with an archbiſhop's ſee. It is ſeated on a mountain, near the river Peſcara, 8 m. SW. of the town of Peſcara. Lon. 15. 7. E. Lat. 42. 20. N.

* CHIEVANCE. *n. ſ.* [probably from *achevance*, Fr. purchaſe.] Traffick, in which money is extorted; as diſcount. Now obſolete.—There were good laws againſt uſury, the baſtard uſe of money; and againſt unlawful *chievances* and exchanges, which is baſtard uſury. *Bacon.*

CHIGI, Fabius, pope of Rome, under the name of Alexander VII. was the ſon of Flavius Chigi, and born at Sienna in 1599. His family finding him a hopeful youth, ſent him early to Rome, where he ſoon engaged in a friendſhip with the marquis Pallavicini, who recommended him ſo effectually to Pope Urban VIII. that he procured him the poſt of Inquiſitor at Malta. He was ſent vice-legate to Ferrara, and afterward nuncio into Germany, where he had an opportunity of diſplaying his intriguing genius; as mediator of Munſter, in the long conference held to conclude a peace with Spain. Cardinal Mazarin had ſome reſentment againſt Chigi, who, in 1652, was made a cardinal and ſecretary of ſtate by Innocent X. but his reſentment was ſacrificed to political views. In 1655, when a pope was to be choſen, Cardinal Sacchetti, Mazarin's great friend, finding he could not be elected himſelf, on account of the powerful oppoſition made by the Spaniſh faction, deſired Cardinal Mazarin to conſent to Chigi's exaltation. His requeſt was granted, and Chigi was elected pope by the votes of all the 64 cardinals in the conclave: an unanimity of which there are but few inſtances in the election of popes. He ſhowed uncommon humility at his election. It is aſſerted, that he had once a mind to turn Proteſtant. The news-papers jn Holland beſtowed great encomiums upon him; and acquainted the world, that he did not approve of the cruel perſecutions of the Waldenſes in Piedmont. There is a volume of his poems extant. He loved the Belles Lettres, and the converſation of learned men. He was extremely fond of ſtately buildings: the grand plan of the college Della Sapienza, which he finiſhed, and adorned with a fine library, remains a proof of his taſte in architecture. He died 22d May, 1677, having filled the papal chair 12 years, 1 month, and 16 days.

CHIGGERON, a river of Aſia, which riſes in Perſia, and runs into the Caſpian ſea, a little to the N. of Amol.

CHIGNECTO, a town of Nova Scotia, on the coaſt of the bay of Fundy, near which was a ſmart action between the Britiſh troops under Major Lawrence, with ſome French and Indians, in 1749; and another between the Britiſh under Lieut. Scott, and the ſame enemies in 1756.

CHIGWELL, in Eſſex, near Epping Foreſt, between Waltham-Abbey and Rumford. It has a free ſchool, founded by Abp. Harſnett, who had been vicar of Chigwell. There is a monument of him in his pontifical robes, in braſs, upon a pedeſtal in the church, where he lies interred. Chigwell is 10 miles NE. of London.

CHIHIRI, or Port Cheer, a ſea port of Arabia Felix, with a harbour. It carries on a conſiderable trade. Lon. 49. 25. E. Lat. 14. 40. N.

CHILAPAN, a town of Mexico, near which there is an entire mountain of load-ſtone.

CHITES, a people of S. America. See Cazic.

(1.) * CHILBLAIN. *n. ſ.* [from *chill*, cold, and *blain*; ſo that Temple ſeems miſtaken in his etymology, or has written it wrong to ſerve a purpoſe.] Sores made by froſt.—I remembered the cure of *chilblains* when I was a boy (which may be called the children's gout), by burning at the fire. *Temple.*

(2.) Chilblain, in medicine, a tumour affecting the feet and hands; accompanied with an inflammation, pains, and ſometimes an ulcer or ſolution of continuity: in which caſe it takes the denomination of Chaps on the hands, and of Kibes on the heels. Chap reſembles Gape, both in ſound and appearance. Chilblains are occaſioned by exceſſive cold ſtopping the motion of the blood in the capillary arteries. See Pernio.

(1.) * CHILD. *n. ſ.* in the plural Children. [*cild*, Sax.] 1. An infant, or very young perſon.

In age, to wiſh for youth is full as vain,
As for a youth to turn a *child* again. *Denham.*

—We ſhould no more be kinder to one *child* than to another, than we are tender of one eye more than of the other. *L'Eſtrange.*—The young lad muſt not be ventured abroad at 8 or 10, for fear of what may happen to the tender *child*: though he then runs ten times leſs riſque than at 16. *Locke.* 2. One in the line of filiation, oppoſed to the parent.—Where *children* have been expoſed, or taken away young, and afterwards have approached to their parents preſence, the parents, though they have not known them, have had a ſecret joy, or other alteration thereupon. *Bacon's Nat. Hiſt.*—3. The deſcendants of a man, how remote ſoever, are called *children*; as the *children* of Edom, the *children* of Iſrael. 4. In the language of ſcripture. —One weak in knowledge. *Iſaiah. 1 Cor.*—Such as are young in grace. *1 John.*—Such as are humble and docile. *Matthew.*—The *children* of light, the *children* of darkneſs; who follow light, who remain in darkneſs.—The elect, the bleſſed, are alſo called the *children* of God.—How is he numbered among the *children* of God, and his lot is among the ſaints! *Wiſdom.*—In the New Teſtament, believers are commonly called *children* of God.—Ye are all the *children* of God, by faith in Jeſus Chriſt. *Gal.* iii. 26. *Calmet.* 5. A girl child. Not in uſe.—

Mercy on's, a bearne, a very pretty bearne!
A boy, or *child*, I wonder! *Shak.*

6. Any thing, the product or effect of another.—

Macduff, this noble paſſion,
Child of integrity, hath from my ſoul
Wip'd the black ſcruples. *Shak.*

7. *To be with* Child. To be pregnant.—

If it muſt ſtand ſtill, let wives with *child*
Pray that their burthen may not fall this day,
Leſt that their hopes prodigiouſly be croſt.
Shakeſpeare.

(2.) Child. See Parent, and Children. Bartholine,

tholine, Paré, Licetus, and many other writers, give an account of a child petrified in its mother's womb. See Foetus.

* *To* Child. *v. n.* [from the noun.] To bring children.—As to *childing* women, young vigorous people, after irregularities of diet, in ſuch it begins with hæmorrhages. *Arbuthnot.*

(1.) * **CHILDBEARING**, particip. ſubſtantive. [from *child* and *bear*.] The act of bearing children.

To thee,
Pains only in *childbearing* were foretold,
And, bringing forth, ſoon recompens'd with joy,
Fruit of thy womb. *Milton.*

(2.) Childbearing. See Midwifery.

(1.) * **CHILDBED.** *n. ſ.* [from *child* and *bed*.] The ſtate of a woman bringing a child, or being in labour.—Women in *childbed* are in the caſe of perſons wounded. *Arbuthnot.*

(2.) Childbed. See Midwifery.

* **CHILDBIRTH.** *n. ſ.* [from *child* and *birth*.] Travail; labour; the time of bringing forth; the act of bringing forth.—In the whole ſex of women, God hath decreed the ſharpeſt pains of *childbirth*; to ſhew, that there is no ſtate exempt from ſorrow. *Taylor.*

(1.) * **CHILDERMAS Day.** [from *child* and *maſs*.] The day of the week, throughout the year, anſwering to the day on which the feaſt of the holy Innocents is ſolemnized, which weak and ſuperſtitious perſons think an unlucky day.—To talk of hares, or ſuch uncouth things, proves as ominous to the fiſherman, as the beginning of a voyage on the day when *childermas day* fell, doth to the mariner. *Carew.*

(2.) Childermas Day, or Innocent's Day, is an anniverſary held by the church of England on the 28th of December, in commemoration of the children of Bethlehem maſſacred by order of Herod.

* **CHILDHOOD.** *n. ſ.* [from *child*, *cildhad*, Sax.] 1. The ſtate of children; or, the time in which we are children: it includes infancy, but is continued to puberty.—

Seldom have I ceas'd to eye
Thy infancy, thy *childhood*, and thy youth. *Milton.*

2. The time of life between infancy and puberty.—Infancy and *childhood* demand thin, copious, nouriſhing aliment. *Arbuthnot.* 3. The properties of a child.—

Their love in early infancy began,
And roſe as *childhood* ripen'd into man. *Dryd.*

* **CHILDISH.** *adj.* [from *child*.] 1. Having the qualities of a child; trifling; ignorant; ſimple.—Learning hath its infancy, when it is but beginning and almoſt *childiſh*; then its youth, when it is luxuriant and juvenile. *Bacon's Eſſays.* 2. Becoming only children; trifling; puerile.—Muſidorus being elder by 3 or 4 years, there was taken away the occaſion of *childiſh* contentions. *Sidney.*—By converſation the *childiſh* humours of their younger days might be worn out. *Arbuthnot.*

* **CHILDISHLY.** *adv.* [from *childiſh*.] In a childiſh trifling way; like a child.—Some men are of excellent judgment in their own profeſſions, but *childiſhly* unſkilful in any thing beſides. *Hayw.*

* **CHILDISHNESS.** *n. ſ.* [from *childiſh*.] 1. Puerility; triflingneſs.—The actions of *childiſhneſs*, and unfaſhionable carriage, time and age will of itſelf be ſure to reform. *Locke.* 2. Harmleſſneſs.—

Speak thou, boy;
Perhaps thy *childiſhneſs* will move him more
Than can our reaſons. *Shak.*

* **CHILDLESS.** *adj.* [from *child*.] Without children; without offspring.—As thy ſword hath made women *childleſs*, ſo ſhall thy mother be *childleſs* among women. 1 *Samuel.*—

* **CHILDLIKE.** *adj.* [from *child* and *like*.] Becoming or beſeeming a child.—Who can owe no leſs than *childlike* obedience to her that hath more than motherly care. *Hooker.*

(1.) **CHILDREN.** the plural of child. See Child, N° 1. Mr Derham computes, that marriages, one with another, produce 4 children, not only in England, but in other parts alſo.

(2.) Children, in law, are a man's iſſue begotten on his wife.

(3.) Children, duties of, to parents. The duties of children to their parents ariſe from a principle of natural juſtice and retribution. For to thoſe who gave us exiſtence, we naturally owe ſubjection and obedience during our minority, and honour and reverence ever after: they who protected the weakneſs of our infancy, are intitled to our protection in the infirmity of their age; they who by ſuſtenance and education have enabled their offspring to proſper, ought, in return, to be ſupported by that offspring, if they need aſſiſtance. Upon this principle proceed all the duties of children to their parents, enjoined by poſitive laws. And the Athenian laws carried this principle into practice with a ſcrupulous kind of nicety; obliging all children to provide for their fathers when fallen into poverty; with an exception to ſpurious children, to thoſe whoſe chaſtity had been proſtituted with conſent of their father, and to thoſe whom he had not put in any way of gaining a livelihood. The legiſlature, ſays baron Monteſquieu, conſidered, that, in the firſt caſe, the father, being uncertain, had rendered the natural obligation precarious; that, in the 2d caſe, he had ſullied the life he had given, and done his children the greateſt of injuries, in depriving them of their reputation; and that, in the 3d caſe, he had rendered their life, ſo far as in him lay, an inſupportable burden, by furniſhing them with no means of ſubſiſtence. Our laws agree with thoſe of Athens, with regard to the firſt only of theſe particulars, the caſe of ſpurious iſſue. In the other caſes, the law does not hold the tie of nature to be diſſolved by any miſbehaviour of the parent; and therefore a child is equally juſtifiable in defending the perſon, or maintaining the cauſe or ſuit, of a bad parent as of a good one; and is equally compellable, if of ſufficient ability, to maintain and provide for a wicked and unnatural progenitor, as for one who has ſhown the greateſt tenderneſs and parental piety. See Filial Affection.

(4.) Children, duties of parents to. See Parent, and Bastard.

(5.) Children, illegitimate. See Bastard.

(6.) Children, management of. See Infant.

(7.) Children, numerous families of. In the genealogical hiſtory of Tuſcany, written by Gamarini, mention is made of a nobleman of Sienna, named Pichi, who by three wives had 150 children; and that, being ſent ambaſſador to the pope and the emperor, he had 48 of his ſons in his retinue. In a monument in the church-yard of St Innocent, at Paris, erected to a woman who died at 88 years of age, it is recorded, that ſhe might have ſeen 288 children directly iſſued from her. But CHILDREN here evidently includes grand-children, &c. Hakewell relates of Mrs Honeywood, a gentlewoman of Kent, who was born in 1527; married at 16 to her only huſband, R. Honeywood, of Charing, Eſq. who died in her 93d year; that ſhe had 16 children of her own body; of whom 3 died young, and a 4th had no iſſue: yet her grand-children amounted to 114; her great-grand-children to 228; and her grand-children's grand-children to 9, before ſhe died: The whole number ſhe might have ſeen in her life-time, being 367. 16+114+228+9=367.—But the faithful mother of the Dalburg family ſaw her offspring of the 6th generation; as recorded in the following diſtich:

MATER (1.) *ait* NATÆ, (2.) *dic* NATÆ, (3.) *filia*, NATAM (4.)
Ut moneat, NATÆ (5.) *plangere* FILIOLAM. (6.)

That is, "the mother (1.) ſays to her daughter, (2.) Daughter, go tell your daughter, (3.) to adviſe her daughter (4.) to chaſtiſe her daughter's (5.) little daughter." (6.)

(8.) CHILDREN, OVERLAYING OF, is a misfortune that frequently happens; to prevent which, the Florentines have contrived an inſtrument called ARCUCCIO; which ſee.

CHILD-WIT, a power to take a fine of a bondwoman unlawfully gotten with child, that is, without conſent of her lord. Every reputed father of a baſe child got within the manor of Writtel in Eſſex, pays to the lord a fine of 3s. 4. where child-wit extends to free as well as bond women.

CHILE. See CHYLE.

CHILHAM, a town of Kent, N. of Godmerſham, near the river Stour; ſaid to be the place where Julius Cæſar encamped in his 2d expedition; and that it was hence called JULHAM, or Julius's hamlet. Below the town there is a green barrow, called JUL-LABER, ſaid to be the grave of Laberius Dorus, the tribune who was killed by the Britons, in the march of the Romans from that camp. Chilham has a fair Nov. 8.

(1.) CHILI, an extenſive country of S. America, lying on both ſides of the Andes, being bounded on the N. by Peru; on the E. by Paraguay, or La Plata; on the South by Patagonia, and on the W. by the Pacific Ocean. It is 1260 miles long, and 580 broad. Some make its extent much greater by including in it Patagonia and Terra del Fuego; while Dr Brookes and Mr Walker evidently err as far on the other ſide, by reducing its length to 750 miles, and its breadth to between 35 and 50; for it is certain that the country extends from 65° to 85° Lon. W. and from 25° to 44° Lat. S.

(2.) CHILI, ATTEMPTED CONQUEST OF. Don Diego De Almagro, the diſcoverer of Chili, made the firſt attempt to conquer this country, in 1535, after he and Pizarro had completed the conqueſt of Peru. He ſet out on his expedition to Chili with a conſiderable body of Spaniards and auxiliary Indians. For 200 leagues he was well accommodated with every neceſſary by the Indians, who had been ſubjects of the emperors of Peru; but reaching the barren country of Charcas, his troops became diſcontented through the hardſhips they ſuffered; which determined Almagro to climb the mountains called Cordilleras, in order to get the ſooner into Chili; being ignorant of the invaluable mines of Potoſi, contained in the province of Charcas where he then was. At that time the Cordilleras were covered with ſnow, the depth of which obliged him to dig the way through it. The cold made ſuch an impreſſion on his naked Indians, that it is computed that no leſs than 10,000 of them periſhed on theſe dreadful mountains, 150 of the Spaniards ſharing the ſame fate; while many of the ſurvivors loſt their fingers and toes through the exceſs of cold. At laſt, after encountering incredible difficulties, Almagro reached a fine, temperate, and fertile plain on the oppoſite ſide of the Cordilleras, where he was received with the greateſt kindneſs by the natives. Theſe poor ſavages, taking the Spaniards for deputies of their god Virachoca, immediately collected for them an offering of gold and ſilver worth 200,000 ducats: and ſoon after brought a preſent to Almagro worth 300,000 more. Theſe offerings only determined him to conquer the whole country as ſoon as poſſible. The Indians among whom he now was, had acknowledged the authority of the Peruvian incas, and conſequently gave Almagro no trouble. He therefore marched immediately againſt thoſe who had never been conquered by the Peruvians, and inhabited the ſouthern parts of Chili. Theſe ſavages fought with great reſolution, and diſputed every inch of ground: but in five months the Spaniards had made ſuch progreſs, that they muſt infallibly have reduced the whole province in a very little time, had not Almagro returned to Peru, in conſequence of a commiſſion ſent him from Spain. In 1540, Pizarro having overcome and put Almagro to death, ſent into Chili, Valdivia, who had learned the rudiments of war in Italy, and was reckoned one of the beſt officers in the Spaniſh ſervice. As he penetrated ſouthwards, however, he met with much oppoſition; the confederated caziques frequently gave him battle, and diſplayed great courage and reſolution; but could not prevent him from penetrating to the valley of Maſiocho, which he found incredibly fertile and populous. Here he founded the city of St Jago; and finding gold mines in the neighbourhood, forced the Indians to work in them; at the ſame time building a caſtle for the ſafety and protection of the new colony. The natives, exaſperated at this ſlavery, immediately took up arms; attacked the fort; and, though defeated and repulſed, ſet fire to the outworks, which contained all the proviſions of the Spaniards. Nor were they diſcouraged by this and many other defeats, but ſtill continued to carry on the war with vigour. At laſt, Valdivia, having overcome them in many battles, forced the inhabitants of the vale to ſubmit; upon which he immediately ſet them to work in the mines of Quilotta. This indignity offered to their countrymen redoubled the fury of thoſe who remained at liberty. Their utmoſt efforts, however, were as yet unable to ſtop Valdivia's progreſs. Having croſſed the large rivers Maulle and Hata, he traverſed a vaſt tract of country, and founded the city of CONCEPTION on the South Sea coaſt. He erected fortreſſes in ſeveral parts of the country, to keep the natives in awe; and built the city IMPERIAL, about 40 leagues S. of Conception. The Spaniſh writers ſay, that the neighbouring valley contained 80,000 inhabitants of a peaceable diſpoſition; and who were even ſo tame as to ſuffer Valdivia to parcel out their lands among his followers, while they themſelves remained in a ſtate of inactivity. About 16 leagues E. of Imperial, the Spaniſh General laid the foundation of VILLA RICA, ſo called on account of the rich gold mines he found there. But his ambition and avarice had now involved him in difficulties from which he could never be extricated; He had extended his conqueſts beyond what his ſtrength was capable of maintaining. The Chileſians were ſtill as deſirous as ever of recovering their liberties. The horſes, fire-arms, and armour of the Spaniards, indeed, appeared dreadful to them; but thoughts of endleſs ſlavery were ſtill more ſo. In the courſe of the war, they had diſcovered that the Spaniards were vulnerable and mortal men like themſelves; they hoped, therefore, by dint of their ſuperiority in numbers, to be able to expel the tyrannical uſurpers. Had all the nations joined in this reſolution, the Spaniards had certainly been exterminated; but ſome of them were of a pacific and fearful diſpoſition, while others conſidered ſervitude as the greateſt of all poſſible calamities. Of this laſt opinion were the Aracceans, the moſt intrepid people in Chili, and who had given Valdivia the greateſt trouble. They all roſe to a man, and choſe Capaulican, a renowned hero among them, for their leader. Valdivia, however, received notice of their revolt ſooner than they intended he ſhould, and returned with all expedition to the vale of Araccea; but before he arrived, 14,000 of the Chileſians were there aſſembled under the Conduct of Capaulican. He attacked them with his cavalry, and forced them to retreat into the woods; but could not obtain a complete victory, as they kept continually ſallying out and haraſſing his men. At laſt Capaulican, having obſerved that fighting with ſuch a number of undiſciplined troops only ſerved to contribute to the defeat and confuſion of the whole, divided his forces into bodies of 1000 each. Theſe he directed to attack the enemy by turns; and, though he did not expect that a ſingle thouſand would put them to flight, he directed them to make as long a ſtand as they could; when they were to be relieved and ſupported by another body; aud thus the Spaniards would be at laſt wearied out and overcome. The event fully anſwered his expectations. The Chileſians maintained a fight for 7 or 8 hours, until the Spaniards, growing faint for want of refreſhment, retired precipitately. Valdivia ordered them to ſeize a paſs at ſome diſtance from the field, to ſtop the purſuit; but this deſign being diſcovered to the Chileſians by the treachery of his page, who was a native of that country, the Spaniards were ſurrounded on all ſides, and cut in pieces by the Indians. The general was taken and put to death: ſome ſay with the tortures uſually inflicted by thoſe ſavages on their priſoners; others, that he had melted gold poured down his throat; but all agree, that the Indians made flutes and other inſtruments of his bones, and preſerved his ſkull as a monument of their victory, which they celebrated by an annual feſtival. After this victory the Chileſians had another engagement with their enemies; in which alſo they proved victorious, defeating the Spaniards with the loſs of near 3000 men; and upon this they bent their whole force againſt the colonies. The city of Conception being abandoned by the Spaniards, was taken and deſtroyed: but the Indians were forced to raiſe the ſiege of Imperial; and their progreſs was at laſt ſtopped by Garcia de Mendoza, who defeated Capaulican, took him priſoner, and put him to death. No defeats, however, could diſpirit the Chileſians. They continued the war 50 years; and to this day they remain unconquered, and give the Spaniards more trouble than any other American nation. Their moſt irreconcileable enemies are the inhabitants of Araccea and Tucapel, thoſe to the S. of the river Bobio, whoſe country extends towards the Cordilleras.—The manners of theſe people greatly reſemble thoſe of North America, (See AMERICANS, § 3—26.) but they ſeem to have a more warlike diſpoſition. It is a conſtant rule with the Chileſians never to ſue for peace. The Spaniards are obliged not only to make the firſt overtures, but to purchaſe it by preſents. They have at laſt been obliged to abandon all thoughts of extending their conqueſts, and reduced to cover their frontiers by erecting forts at proper diſtances.

(3.) CHILI, CLIMATE, SOIL, &c. OF. The climate of Chili is one of the moſt delightful in the world; being a medium between the intenſe heat of the torrid, and the piercing cold of the frigid zones. The ſoil is extremely fertile; and indeed there is no part of the world more favoured than this, with reſpect to the gifts of nature: here, not only the tropical fruits, but all the ſpecies of grain, of which a conſiderable part is exported, come to great perfection. The horſes of Chili are in great eſteem; and vaſt herds of oxen, goats, and ſheep, are fattened in the luxuriant paſtures of Chili, the breeding of which is more attended to than any other ſpecies of huſbandry in this country. Turkeys, geeſe, and all kinds of poultry, are found here in immenſe profuſion.—Mines of gold, ſilver, copper, tin, quickſilver, iron, and lead, abound in this country. Vaſt quantities of gold are waſhed down from the mountains by brooks and torrents; the annual amount of which, when manufactured, is eſtimated at not leſs than eight millions of dollars. The coaſts abound with various kinds of excellent fiſh: there are alſo many whales and ſeals.

(4.) CHILI, COLONIES IN. The Spaniſh colonies in Chili are diſperſed on the borders of the South ſea. They are ſeparated from Peru by a deſert 80 leagues in breadth; and bounded by the iſland of Chiloe, at the extremity next the ſtraits of Magellan. Their only ſettlements on the coaſt are thoſe of Baldivia, Conception iſland, Valparaiſo, and Coquimbo or La Serena, which are all ſea ports. In the inland country is St Jago, the capital of the colony. There is no culture nor habitation at any diſtance from theſe towns. The buildings in the whole province are low, made of unburnt brick, and moſtly thatched. This practice is obſerved on account of the frequent earthquakes; and is properly adapted to the nature of the climate, as well as the indolence of the people.

(5.) Chili, government of the province of. Chili is governed by a chief, who is abſolute in all civil, political, and military affairs, and is alſo independent of the viceroy. The latter has no authority except when a governor dies; in which caſe he may appoint one in his room for a time, till the mother country names a ſucceſſor. If, on ſome occaſions, the viceroy has interfered in the government of Chili, it was when he has been either authoriſed by a particular truſt repoſed in him by the court, or by the deference paid to the eminence of his office; or when actuated by his own ambition to extend his authority.

(6.) Chili, population of. It has been ſuppoſed that the population of Chili did not exceed 800,000 of both colours; but the Abbe Raynal ſays, that there are 40,000 in St Jago alone; and the population of Chili has been eſtimated by others at 80,000 whites, and 240,000 negroes. The military eſtabliſhment amounted formerly to 2000 men; but the maintaining of them being found too expenſive, they were reduced to 500 at the beginning of the 18th century.

(7.) Chili, trade of. With all its advantages, Chili has no direct intercourſe with Spain. Its trade is confined to Peru, Paraguay, and the native Chileſians on the frontiers. With theſe laſt they exchange their leſs valuable commodities, for oxen, horſes, &c. This province ſupplies Peru with great plenty of hides, dried fruit, copper, ſalt meat, horſes, hemp, lard, wheat, and gold. In exchange, it receives tobacco, ſugar, cocoa, earthen ware, woollen cloth, linen, hats, made at Quito, and every article of luxury brought from Europe. The ſhips ſent from Callao on this traffic were formerly bound to Conception Bay, but now come to Valparaiſo. The commerce between this province and Paraguay is carried on by land, though it is a journey of 300 leagues, 40 of which lie through the ſnows and precipices of Cordilleras; but if it was carried on by ſea, they muſt either paſs the ſtraits of Magellan, or double Cape Horn, which the Spaniards always avoid as much as poſſible. To Paraguay are ſent ſome woollen ſtuffs called *ponchos*, which are uſed for cloaks; alſo wines, brandy, oil, and chiefly gold. In return, they receive wax, a kind of tallow fit to make ſoap, European goods, and negroes.

* CHILIAD. *n. ſ.* [from χιλιας.] A thouſand; a collection or ſum containing 1000.—We make cycles and periods of years; as decads, centuries, *chiliads*, for the uſe of computation in hiſtory. *Holder*.

* CHILIAEDRON. *n. ſ.* [χιλια.] A figure of 1000 ſides.—In a man, who ſpeaks of a *chiliaedron*, or a body of 1000 ſides. the idea of the figure may be very confuſed, though that of the number be very diſtinct. *Locke*.

CHILIAGON, in geometry, a regular plain figure of 1000 ſides and angles. Though the imagination cannot form an idea of ſuch a figure, yet it is aſſerted, we may have a notion of it in the mind, as we can eaſily demonſtrate that the ſum of all its angles is equal to 1996 right ones: for the internal angles of every plane figure are equal to twice as many right ones as the figure hath ſides, except thoſe 4 which are about the centre of the figure, from whence it may be reſolved into as many triangles as it has ſides. The author of *l' Art de Penſer*, p. 44. has brought this inſtance to ſhow the diſtinction between imagination and conceiving.

CHILIARCHA, or } in antiquity, an officer
CHILIARCHUS, } who had the command of 1000 men.

* CHILIFACTIVE. *adj.* [from *chile*.] That which makes chile.—Whether this be not affected by ſome way of corroſion, rather than any proper digeſtion, *chiliſactive* mutation, or alimental converſion. *Brown*.

* CHILIFACTORY. *adj.* [from *chile*.] That which has the quality of making chile.—We ſhould rather rely upon a *chiliſactory* menſtruum, or digeſtive preparation, drawn from ſpecies or individuals, whoſe ſtomachs peculiarly diſſolve lapideons bodies. *Brown*.

* CHILIFICATION. *n. ſ.* [from *chile*.] The act of making chile.—Nor will we affirm that iron is indigeſted in the ſtomach of the oſtrich; but we ſuſpect this effect to proceed not from any liquid reduction, or tendence to *chylification*, by the power of natural heat. *Brown*.

CHILKA, a lake of the Deccan of Hindooſtan, on the ſea coaſt of the province of Cattack, on the NW. ſide of the Bay of Bengal. It communicates with the ſea, by a very narrow, but deep opening, and is ſhallow within. It is 40 miles long from NE. to SW. and in general from 12 to 15 feet wide; having many inhabited iſlands in it, and only a narrow ſlip of land between it and the ſea. It is bounded on the W. by a part of that ridge of mountains which extend from the Mahanudy to the Godavery rivers, and ſhut up the Circars towards the continent. It is 40 miles SW. of Cattack.

(1.) * CHILL. *adj.* [*cele*, Sax.] 1. Cold; that which is cold to the touch.—

And all my plants I ſave from nightly ill,
Of noiſome winds, and blaſting vapours *chill*.
Milton.

2. Cold; having the ſenſation of cold; ſhivering with cold.—My heart, and my *chill* veins, freeze with deſpair *Rowe*. 3. Dull; not warm; not forward: as, a *chill* reception. 4. Depreſſed; dejected; diſcouraged.

(2.) * Chill. *n. ſ.* [from the adjective.] Chilneſs; cold.—I very well know one to have a ſort of *chill* about his præcordia and head. *Derham*.

* *To* Chill. *v. a.* [from the adjective.] To make cold.—

Each changing ſeaſon does its poiſon bring;
Rheums *chill* the winter, agues blaſt the ſpring.
Prior.

2. To depreſs, to deject; to diſcourage.—Every thought on God *chills* the gaiety of his ſpirits, and awakens terrors, which he cannot bear. *Rogers*.
3. To blaſt with cold.—

The fruits periſh on the ground,

Or ſoon decay, by ſnows immoderate *chill'd*,
By winds are blaſted, or by lightning kill'd.
Blackmore.

* CHILLINESS. *n. ſ.* [from *chilly*.] A ſenſation of ſhivering cold.—If the patient ſurvives three days, the acuteneſs of the pain abates, and a *chillineſs* or ſhivering affects the body. *Arbuthnot.*

CHILLINGWORTH, William, an eminent divine of the church of England, born at Oxford in 1602, and educated there. He was an expert mathematician, an able divine, and a good poet. Study and converſation at the univerſity turning upon the controverſy between the church of England and that of Rome, Mr Chillingworth left the former, and embraced the Romiſh religion. Dr Laud, then biſhop of London, hearing of this, wrote Mr Chillingworth; who expreſſing much candour and impartiality, that prelate continued to correſpond with him. This ſet Mr Chillingworth on a new inquiry; and at laſt determined him to return to his former religion. In 1634, he wrote a confutation of the arguments which had induced him to go over to the church of Rome. His return to the church of England engaged him in ſeveral diſputes with thoſe of the Romiſh perſuaſion. But in 1635 he engaged in a work, which gave him a better opportunity to confute the principles of the church of Rome, and to vindicate the Proteſtant religion, intituled "The Religion of Proteſtants a ſafe Way to Salvation." Sir Thomas Coventry, offering him preferment, Mr Chillingworth refuſed to accept it on account of his ſcruples about the ſubſcription of the 39 articles. However, he at laſt ſurmounted theſe; and was promoted to the chancellorſhip of Sarum, with the prebend of Brixworth. He was zealouſly attached to the royal party; and, in Aug. 1653, was in the king's army at the ſiege of Glouceſter, where he directed the making certain engines for aſſaulting the town. Soon after, having accompanied Lord Hopton to Arundel caſtle, he was taken priſoner by the parliamentary forces under Sir William Waller. But being in a bad ſtate of health, he obtained leave to be conveyed to the biſhop's palace at Chicheſter, where he died in 1644. He left ſeveral excellent works.

* CHILLY. *adj.* [from *chill*.] Somewhat cold.—
A *chilly* ſweat bedews
My ſhudd'ring limbs. *Phillips.*

CHILMARK, a town in Wilts, ſeated on the Nadder, near Chicklade, 12 m. from Saliſbury. It has a fair, July 30, and is famous for quarries of good white ſtone.

CHILMINAR, the grandeſt piece of ancient architecture of which there are any relics extant; being the ruins of the famous palace of Perſepolis, which was burnt by Alexander the Great; when drunk, at the perſuaſion of the infamous Thais. See PERSEPOLIS.

* CHILNESS. *n. ſ.* [from *chill*.] Coldneſs; want of warmth.—If you come out of the ſun ſuddenly into a ſhade, there followeth a *chilneſs* or ſhivering in all the body. *Bacon.*

CHILO, one of the 7 ſages of Greece, and of the ephori of Sparta, the place of his birth, flouriſhed about A. A. C. 556. He was accuſtomed to ſay, that there were 3 things very difficult; "To keep a ſecret; to know beſt how to employ our time; and to ſuffer injuries without murmuring." According to Pliny, it was he who cauſed the ſentence, *Know thyſelf*, to be written in letters of gold in the temple of Delphos. It is ſaid that he died with joy, embracing his ſon, who had been crowned at the Olympic games.

CHILOE, an iſland lying near the coaſt of Chili, in South America, under 43° Lat. S. It is the cheif of an archipelago of 40 iſlands, and its principal town is Caſtro. It rains here almoſt all the year, inſomuch that nothing but Indian corn, or ſome ſuch grains, that requires but little heat to ripen it, can ever come to perfection. They have excellent ſhell fiſh, very good wild fowl, hogs, ſheep, and beeves; as alſo a great deal of honey and wax. They carry on a trade with Peru and Chili; whither they ſend boards of cedar, of which they have vaſt foreſts.

CHILONIAN, or CHILONIC STYLE, } a brief and compendious ſtyle, reſembling that of Chilo.

CHILTENHAM. See CHELTENHAM.

(1.) CHILTERN, a chain of chalky hills forming the ſouthern part of Buckinghamſhire, the northern part of the county being diſtinguiſhed by the name of the VALE. The air on theſe heights is extremely healthful; The ſoil, though ſtony, produces good crops of wheat and barley; and in many places it is covered with thick woods, among which are great quantities of beech.

(2.) CHILTERN is alſo applied to the hilly parts of Berkſhire, and it is believed has the ſame meaning in ſome other countries. Hence the HUNDREDS lying in thoſe parts are called the CHILTERN HUNDREDS. See § 5.

(3.) CHILTERN ALL-SAINTS, E. of Warminſter, Wilts.

(4.) CHILTERN GREEN, in Hertfordſh. on the road from Welwyn to Luton.

(5.) CHILTERN HUNDREDS STEWARDS, OF THE. Of the Hundreds into which many of the Engliſh counties were divided by King Alfred for their better government, the juriſdiction was originally veſted in peculiar courts; but came afterwards to be devolved to the county courts, and ſo remains at preſent; except with regard to ſome, as the chilterns, which have been by privilege annexed to the crown. Theſe having ſtill their own courts, a Steward of thoſe courts is appointed by the chancellor of the exchequer, with a ſalary of 20s. and all fees, &c. belonging to the office. This is made a matter of convenience to the members of parliament. When any one wiſhes to reſign, he accepts the Stewardſhip of the Chiltern Hundreds, which vacates his ſeat.

(6.) CHILTERN ST MARY, a village in Wiltſhire, near Hareſbury.

(1.) CHIMÆRA, a territory of European Turkey, in the province of Albania. It comprehends a chain of mountains, which divide Epirus from Theſſaly; and the inhabitants of which are one half independent, and the others ſubject to the Turks.

(2.) CHIMÆRA, a port town in the above territory, (N° 1.) ſeated on a rock, at the entrance of the gulph of Venice, about 29 miles N. of Corfu. Lon. 20. 8. E. Lat. 40. 8. N.

(3.) CHIMÆRA, in fabulous hiſtory, a monſter, ſprung from Echidna and Typhon. It had three heads; that of a lion, a goat, and a dragon; and continually vomited flames. The fore parts of its body were thoſe of a lion, the middle was that of a goat, and the hinder parts were thoſe of a dragon. It reſided in Lycia, in the reign of Jobates, by whoſe orders Bellerophon, mounted on the horſe Pegaſus, overcame it. See BELLEROPHON. This fable is thus explained. There was a burning mountain in Lycia, whoſe top was the reſort of lions; the middle, which was fruitful, was covered with goats; and at the bottom the marſhy ground abounded with ſerpents. Bellerophon deſtroyed the wild beaſts on that mountain, and rendered it habitable. Plutarch explains the fable, to mean the captain of ſome pirates, who adorned their ſhip with the images of a lion, a goat, and a dragon.

(4.) CHIMÆRA, in metaphor. See CHIMERA.

CHIMAN, a river of South America, which falls into the Pacific Ocean.

(1.) CHIMAY, a large lake of Aſia, ſituated in the kingdom of Achem, between China and the E. Indies.

(2.) CHIMAY, a town of France in the department of the North, and ci-devant province of Hainault, ſeated on the Blanche; 20 miles SSW. of Charleroy. It has been often ruined by wars and as often rebuilt. Near it are mines of iron, with founderies and forges. Lon. 4. 15. E. Lat. 50. 0. N.

* CHIMB. *n. ſ.* [*kime*, Dut.] The end of a barrel or tub.

CHIMBE, a town of South America, and capital of a juriſdiction, in the province of Quito. The town contains about 80 families, Spaniards and Indians, and the whole diſtrict about 80 inhabitants.

CHIMBORAZO, a mountain of S. America, the moſt celebrated of the ANDES, and ſuppoſed to be the higheſt in the world; being 20,608 feet above the ſea level. Of this more than 2000 feet from the ſummit is conſtantly covered with ice and ſnow, though it lies almoſt under the line, in Lat. 1° 41′ 40″ S.

(1.) * CHIME. *n. ſ.* [The original of this word is doubtful. *Junius* and *Minſhew* ſuppoſe it corrupted from *cimbal*; *Skinner* from *gamme*, or *gamut*; *Henſhaw* from *chiamare*, to *call*, becauſe the *chime* calls to church. Perhaps it is only ſoftened from *chirme*, or *churme*, an old word for the ſound of many voices, or inſtruments making a noiſe together.] 1. The conſonant or harmonick ſound of many correſpondent inſtruments.—

The ſound
Of inſtruments, that make melodious *chime*,
Was heard, of harp and organ. *Milton*.

2. The correſpondence of ſound.—

Love firſt invented verſe, and form'd the rhyme,
The motion meaſur'd harmoniz'd the *chime*. *Dryden*.

3. The ſound of bells, not rung by ropes, but ſtruck with hammers. In this ſenſe it is always uſed in the plural, *chimes*.—We have heard the *chimes* at midnight. *Shakeſpeare*. 4. The correſpondence of proportion or relation.—The conceptions of things are placed in their ſeveral degrees of ſimilitude; as in ſeveral proportions, one to another: in which harmonious *chimes*, the voice of reaſon is often drowned. *Grew's Coſmol.*

(2.) CHIMES OF A CLOCK, a kind of periodical muſic, produced at equal intervals of time, by a particular apparatus added to a clock. To calculate numbers for the chimes, and adapt the chime barrel, it muſt be obſerved, that the barrel muſt turn around in the ſame time that the tune it is to play requires in ſinging. The chime barrel may be made up of certain bars that run athwart it, with a convenient number of holes punched in them to put in the pins that are to draw each hammer: and theſe pins, in order to play the time of the tune rightly, muſt ſtand upright, or hang down from the bar, ſome more, ſome leſs. In placing the pins, proceed by the way of changes on bells, viz. 1, 2, 3, 4; or rather make uſe of the muſical notes. Obſerve what is the compaſs of the tune, and divide the barrel accordingly from end to end. Thus, in the examples on Plate LXIX, Fig. 10. each of the tunes is 8 notes in compaſs: and accordingly the barrel is divided into 8 parts: Fig. 11. Theſe diviſions are ſtruck round the barrel; oppoſite to which are the hammer tails. We have here ſuppoſed only one hammer to each bell; but when two notes of the ſame ſound come together in a tune, there muſt be two hammers to the bell to ſtrike it. Thus, if, in all the tunes intended to chime, of 8 notes compaſs, there ſhould happen to be ſuch double notes on every bell, inſtead of 8, there muſt be 16 hammers; and accordingly the barrel muſt be divided, and 16 ſtrokes ſtruck round it, oppoſite to each hammer-tail; Then it muſt be divided round about into as many diviſions as there are muſical bars, ſemibreves, minims, &c. in the tune. Thus the 100th pſalm tune has 20 ſemibreves, and each diviſion of it is a ſemibreve: the firſt note of it alſo is a ſemibreve; and, therefore, on the chime-barrel muſt be a whole diviſion, from five to five; as any one may underſtand plainly, if he conceives the ſurface of a chime-barrel to be repreſented by the above figures, as if the cylindrical ſuperficies of the barrel were ſtretched out at length, or extended on a plane: and then ſuch a table, ſo divided, if it were to be wrapped round the barrel, would ſhow the places where all the pins are to ſtand in the barrel; for the dots running about the table are the places of the pins that play the tune. Indeed, if the chimes are to be complete, there ought to be a ſet of bells to the gamut notes; ſo that each bell having the true ſound of *ſol*, *la*, *mi*, *fa*, any tune may be played with its flats and ſharps: nay, both the baſs and treble may thus be played with one barrel: and by ſetting the names of the bells at the head of any tune, that tune may eaſily be transferred to the chime barrel, without any ſkill in muſic: but it muſt be obſerved, that each line in the muſic is 3 notes diſtant; that is, there is a note between each line, as well as upon it.

(1.) * *To* CHIME. *v. a.* [from the noun.] 1. To move, or ſtrike, or cauſe to ſound harmonically, or with juſt conſonancy.—

With lifted arms they order every blow,
And *chime* their ſounding hammers in a row:
With labour'd anvils Ætna groans below. *Dryd.*

2. To ſtrike a bell with a hammer.

(2.) * *To* CHIME. *v. n.* 1. To ſound in harmony or conſonance.—

To make the rough recital aptly *chime*,
Or bring the ſum of Gallia's loſs to rhyme,
'Tis mighty hard. *Prior.*

2. To correſpond in relation or proportion.—Father and ſon, huſband and wife, and ſuch other correlative terms, do belong one to another; and, through cuſtom, do readily *chime*, and anſwer one another, in people's memories. *Locke.* 3. To agree; to fall in with.—He not only ſat quietly and heard his father railed at, but often *chimed* in with the diſcourſe. *Arbuth.* 4. To ſuit with; to agree.—Any ſect, whoſe reaſonings, interpretation, and language, I have been uſed to, will, of courſe, make all *chime* that way; and make another, and perhaps the genuine meaning of the author, ſeem harſh, ſtrange and uncouth to me. *Locke.* 5. To jingle; to clatter.—

But with the meaner tribe I'm forc'd to *chime*,
And, wanting ſtrength to riſe, deſcend to rhyme. *Smith.*

* CHIMERA. *n. ſ.* [*Chimæra*, Lat.] A vain and wild fancy, as remote from reality as the exiſtence of the poetical chimera, a monſter feigned to have the head of a lion, the belly of a goat, and the tail of a dragon.—Nobody joins the voice of a ſheep with the ſhape of a horſe, to be the complex ideas of any real ſubſtances, unleſs he has a mind to fill his head with *chimeras*, and his diſcourſe with unintelligible words. *Locke.*

* CHIMERICAL. *adj.* [from *chimera*.] Imaginary; fanciful; wildly, vainly, or fantaſtically conceived; fantaſtick.—Notwithſtanding the fineneſs of this allegory may atone for it in ſome meaſure, I cannot think that perſons of ſuch a *chimerical* exiſtence are proper actors in an epic poem. *Spectator.*

* CHIMERICALLY. *adv.* [from *chimerical*.] Vainly; wildly; fantaſtically.

(1.) CHIMHAM, the ſon of Barzillai the Gileadite, who was rewarded by David, for his father's kindneſs, with a piece of ground.

(2.) CHIMHAM, a town in Judea, near Bethlehem, built on Chimham's ground, (N° 1.) and named after him.

CHIMILO, a river of S. America, which runs into the Pacific Ocean.

* CHIMINAGE. *n. ſ.* [from *chimin*, an old law word for a road.] A toll for paſſage through a foreſt. *Cowel.*

CHIMLEIGH, or (1.) CHIMLEY, a town of England, in the county of Devon, ſeated on the river Dart, which almoſt ſurrounds it, near half way between Exeter and Barnſtaple; 21 miles NNW. of Exeter, and 123 from London. It has a market on Wed. and a fair Aug. 2.

(2.) CHIMLEY, in Oxfordſh. SE. of Bampton.

CHIMMAR, a veſtment without ſleeves worn by biſhops between their gown and rocket.

(1.) * CHIMNEY. *n. ſ.* [*cheminée*, French.] 1. The paſſage through which the ſmoke aſcends from the fire in the houſe.—*Chimnies*, with ſcorn, rejecting ſmoke. *Swift.* 2. The turret raiſed above the roof of the houſe, for conveyance of the ſmoke.—

The night has been unruly: where we lay,
Our *chimnies* were blown down. *Shak.*

3. The fireplace.—The fire which the Chaldeans worſhipped for a god, is crept into every man's *chimney*. *Raleigh.*

(2.) CHIMNEYS are generally ſuppoſed to be a modern invention, as the ancients uſed only ſtoves; but Octavius Ferrari endeavours to prove that the ancients uſed chimneys. He adduces proofs of this from Ariſtophanes, Virgil and Appian. But the uncertain meaning of ſome of theſe paſſages, and more eſpecially the obſcurity of Vitruvius on this ſubject, leave the matter ſtill uncertain.

(3.) CHIMNEYS, CONSTRUCTION OF. See ARCHITECTURE, *Index*. The moſt judicious remarks, on the conſtruction of Chimneys, ſo as to prevent ſmoking, are thoſe of the celebrated Dr Franklin. See SMOKING.

(4.) CHIMNEYS, SMOKY, METHODS OF CURING. Various methods have been deviſed for curing ſmoky chimneys. M. Lucar adviſes two holes, or two pipes, one over the other, to be made in each ſide of the chimney; one ſloping upwards, the other downwards: through one of theſe, he ſays, the ſmoke will paſs in any poſition. De L'Orme orders a braſs ball full of water, with one ſmall aperture, to be hung up in the chimney, at a height a little above the greateſt flame: As the water grows hot, it rarefies, and drives through the aperture in a vapoury ſteam, which drives up the ſmoke that would otherwiſe linger in the funnel. Others place a kind of moveable vane, or weathercock, on the top of the chimney: ſo that what way ſoever the wind comes, the aperture of the chimney is ſcreened and the ſmoke has free egreſs: but the beſt prevention of a chimney from ſmoking ſeems to lie in the proper ſituation of the doors of the room, and the apt falling back of the back, and convenient gathering of the wings and breaſt of the chimney.

CHIMNEY JAMBS, the ſides of a *chimney*, uſually ſtanding out perpendicularly, ſometimes circularly, from the back; on the extremities whereof the mantle-tree reſts.

* CHIMNEY-PIECE. *n. ſ.* [from *chimney* and *piece*.] The ornamental piece of wood, or ſtone, that is ſet round the fireplace.—Poliſh and brighten the marble hearths and *chimneypieces* with a clout dipt in greaſe. *Swift.*

* CHIMNEYSWEEPER. *n. ſ.* [from *chimney* and *ſweeper*.] 1. One whoſe trade it is to clean foul chimnies of ſoot.—

The little *chimneyſweeper* ſkulks along,
And marks with ſooty ſtains the heedleſs throng.
Gay.

2. It is uſed proverbially for one of a mean and vile occupation.—

Golden lads and girls, all muſt,
As *chimneyſweepers*, come to duſt. *Shak.*

CHIMPANZEE, in zoology. See SIMIA.

* CHIN. *n. ſ.* [*cinne*, Sax. *kinn*, Germ.] The part of the face beneath the under lip.—But all the words I could get of her, was wrying her waiſt, and thruſting out her *chin*. *Sidney.*

(I. 1.) CHINA, a country of Aſia, ſituated on the moſt eaſterly part of that continent. It is bounded on the N. by Eaſt Tartary; from which it is divided, partly by a prodigious wall of above 2000 miles in length, and partly by high, craggy, and inacceſſible mountains: On the E. by the Yellow Sea, and the Chineſe ocean; on the W. by part of the Mogul's empire, and India beyond the Ganges, from which it is parted by other ridges of high mountains and ſandy deſerts: and on the S. partly by the kingdoms of Lao, Tonquin, Ava, and Cochin-China, and partly by the ſouthern or India ſea, which flows between it and the Philippine iſlands. Its length and breadth are variouſly reckoned. According to ſome, it is 1269 miles long; others ſtate it at 1600, or 1800 miles in length, and as much in breadth. However, by the beſt and lateſt accounts, this vaſt country is ſomewhat of an oval form, the breadth being 1260, and the length 1450 miles. The Chineſe call their country *Tchong-Qua*, which ſignifies the kingdom of the centre, their vanity leading them to conſider it as the moſt diſtinguiſhed region of the world, and ſituate in the middle thereof. The Weſtern Moguls called this country *Catay;* the Mantchew Tartars *Nicamcourou;* the Japaneſe *Thau;* and the people of Cochinchina and Siam *Cin;* from which laſt appellation it is probable the name CHINA is derived. This country is divided into fifteen provinces; for the names and extent of which, with the population, ſee § 24, 25.

(2.) CHINA, CLIMATE, SOIL, MOUNTAINS, METALS, &c. OF. The climate, as well as the ſoil, of this extenſive empire, is very different in different parts; ſevere cold being often felt in the northern provinces, while the inhabitants of the ſouthern ones are ſcarce able to bear the heat. In general, however, the air is accounted wholeſome, and the inhabitants live to a great age.—The northern and weſtern provinces have many mountains, which in the latter are cultivated, but in the former are barren, rocky, and incapable of improvement. On the mountains of Chenſi, Honan, Canton, and Fokien, are many foreſts, abounding with tall, ſtraight trees, of different kinds, fit for building, and particularly adapted for maſts and ſhip timber. Theſe are uſed by the emperor in his private buildings; and from theſe foreſts enormous trunks are ſometimes tranſported to the diſtance of more than three hundred leagues. Other mountains contain quick ſilver, iron, tin, copper, gold, and ſilver. They are alſo ſaid to produce a peculiar ſpecies of WHITE COPPER; but this is juſtly ſuſpected to be factitious. Formerly the gold and ſilver mines were not allowed to be opened, leſt the people ſhould thereby be induced to neglect the natural riches of the ſoil; and in the 15th century, the emperor cauſed a mine of precious ſtones to be ſhut, which had been opened by a private perſon. Of late, however, the Chineſe are leſs ſcrupulous, and a great trade in gold is carried on by them. Many extravagant fables are told by the Chineſe of their mountains, particularly of one in Chenſi which throws out flames, and produces violent tempeſts, whenever any one beats a drum or plays on a muſical inſtrument near it.—In the province of Fokien is a mountain, the whole of which is an idol, or ſtatue of the god Fo. This natural coloſſus, for it appears not to have been the work of art, is of ſuch an enormous ſize, that each of its eyes is ſeveral miles in circumference, and its noſe extends ſome leagues. There is a volcano at Lineſung.

(3.) CHINA, FERTILITY OF. China is, in general, a fertile country; and indeed all travellers agree in this reſpect, and make encomiums on the extent and beauty of its plains. So careful are the huſbandmen to loſe none of their ground, that neither incloſure, hedge, nor ditch, nay, ſcarce a ſingle tree, are ever to be met with. In ſeveral places the land yields two crops a-year: and even in the interval between the harveſts, the people ſow ſeveral kinds of pulſe and ſmall grain. The plains of the northern provinces yield wheat: thoſe of the ſouthern, rice, becauſe the country is low and covered with water.

(4.) CHINA, FREQUENT FAMINES IN. Notwithſtanding all this fertility, however, the inhabitants are much more frequently afflicted with famine than thoſe of the European nations, though the countries of Europe produce much less than China. For this two cauſes are aſſigned. i. The deſtruction of the riſing crops by drought, hail, inundations, locuſts, &c. in which caſe China cannot, like the European countries, be ſupplied by importation. This is evident by conſidering how it is ſituated with regard to other nations. On the N. are the Mogul Tartars, a lazy and indolent race, who ſubſiſt principally on the fleſh of their flocks; ſowing only a little millet for their own uſe. The province of Leatong, which lies to the NE. is indeed extremely fertile, but too far diſtant from the capital and centre of the empire to ſupply it with proviſions: and beſides, all carriage is impracticable but in the winter, when great quantities of game, and fiſh, preſerved in ice, are ſent thither. No corn is brought from Corea to China; and, though the Japan iſlands are only 3 or 4 days ſailing from Kiang-nan and Che-kyang, yet no attempt was ever made to obtain proviſions from thence. Formoſa lies oppoſite to the province of Fo-kien; but ſo far is that iſland from being able to ſupply any thing, that in a time of ſcarcity it requires a ſupply from China itſelf. Canton is bounded by the ſea, and has nothing on the S. but iſlands and remote countries: And the iſland of Macao is generally ſupplied from China itſelf. To guard againſt famines public granaries are erected. But ſo many ceremonies are to be gone through before any ſupply can be drawn from thoſe repoſitories, that it ſeldom arrives in proper time, at the places where it is wanted. ii. Another cauſe of the ſcarcity of grain is the prodigious conſumpt of it in the compoſition of wines, and a ſpirituous liquor called *rack*. But though government is well apprized that this is one of the principal ſources of famine, it never employs means ſufficient to prevent it.

(5.) CHINA, GOVERNMENT OF. The government of China, according to the Abbe Groſier, is purely patriarchal. The emperor is more unlimited in his authority than any other potentate on earth; no ſentence of death, pronounced by any of the tribunals, can be executed without his conſent, and every verdict in civil affairs is ſubject to be reviſed by him; nor can any determination be of force until it has been confirmed by the emperor: and, on the other hand, whatever ſentence he paſſes is executed without delay; his edicts are reſpected throughout the empire, as if they came from a divinity; he alone has the diſpoſal of all offices, nor is there any ſuch thing as the purchaſe of places in China; merit; real or ſuppoſed, raiſes to an office, and rank is attached to it only. Even the ſucceſſion to the throne is not altogether hereditary. The emperor of China has a power of chooſing his own ſucceſſor without conſulting any of his nobility; and can ſelect one, not only from among his own children, but even from the body of his people. There have been ſeveral inſtances of his making uſe of this right; and he has even a power of altering the ſucceſſion, after it has once been fixed, in caſe the perſon pitched upon does not behave towards him with proper reſpect. The emperor can alſo prevent the princes of the blood from exerciſing the title, with which, according to the conſtitution of the empire, they are inveſted. They may indeed poſſeſs their hereditary dignity; in which caſe they are allowed a revenue proportioned to their birth, as well as a palace, officers, and court: but they have neither influence nor power, and their authority is lower than that of the meaneſt mandarin. (See § 17.) The whole civil government of China is managed by the following courts. 1. The emperor's grand council compoſed of all the miniſters of ſtate, preſidents and aſſeſſors of the 6 ſovereign courts, and of 3 others, to be afterwards mentioned. This is never aſſembled but on affairs of the greateſt importance; the emperor's private council being ſubſtituted to it in all caſes of ſmaller moment. 2. The chief of the other courts furniſhes mandarins for the different provinces, watches over their conducts, keeps a journal of their tranſactions, and informs the emperor of them, who rewards or puniſhes according to the report he gets. This 2d tribunal, which may be called a kind of civil inquiſition, is ſubdivided into 4 others; the firſt entruſted with the care of ſelecting thoſe who, on account of their learning or other good properties, are capable of filling the offices of government; the 2d appointed to take care of the conduct of the mandarins; the 3d affixing the ſeals to the different public acts, giving the ſeals to mandarins, and examining thoſe of the different diſpatches; while the 4th enquires into the merit of the grandees of the empire, not excepting the princes of the imperial blood themſelves. The principal ſovereign court to which theſe 4 laſt are ſubordinate is called *Lii-pou*. 2. *How-pou*, or the grand treaſurer, ſuperintends all the finances of the ſtate; is the guardian and protector of the treaſures and dominions of the emperor, keeping an account of his revenues, &c. ſuperintending the management and coining of money; the public magazines, cuſtom-houſes; and, laſtly, keeping an exact regiſter of all the families in the empire. To aſſiſt this court, 14 others are appointed throughout the different provinces of the empire. 3. *Li-pou*, or the court of ceremonies. "It is an undoubted fact (ſays M. Groſier), that ceremonies form, in part, the baſe of the Chineſe government. This tribunal therefore takes care to ſupport them, and enforce their obſervance; it inſpects alſo the arts and ſciences. It is conſulted by the emperor when he deſigns to confer particular honours; takes care of the annual ſacrifices offered up by him, and even regulates the entertainments which he gives either to ſtrangers or to his own ſubjects. It alſo receives and entertains foreign ambaſſadors, and preſerves tranquillity among the different religious ſects in the empire. It is aſſiſted by four inferior tribunals. 4. *Ping-pou*, or the tribunal of arms, comprehends, in its juriſdiction, the whole militia of the empire; inſpecting alſo the fortreſſes, magazines, arſenals, and ſtore-houſes of every kind, as well as the manufactories of arms both offenſive and defenſive; examining and appointing officers of every rank. It is compoſed entirely of mandarins of letters; and the 4 tribunals depending upon it conſiſt alſo of literati." 5. The *bong-pou* is the criminal bench for the whole empire, and is aſſiſted by 14 ſubordinate tribunals. 6. The *cong-pou*, or tribunal of public works, ſurveys, and keeps in repair the emperor's palaces, as well as thoſe of the princeſs and viceroys, and the buildings where the tribunals are held, with the temples, tombs of the ſovereigns, and all public monuments. It has beſides, the ſuperintendance of the ſtreets, public high-ways, bridges, lakes, rivers, and every thing relating either to internal or foreign navigation. Four inferior tribunals aſſiſt in the diſcharge of theſe duties; the firſt drawing the plans of public works; the 2d directing the work-ſhops in the different cities of the empire; the 3d ſurveying the cauſeways, roads, bridges, canals, &c.; and the 4th taking care of the emperor's palace, gardens, and orchards, and receiving their produce. All theſe tribunals are compoſed, one half of Chineſe, and the other of Tartars: and one of the preſidents of each ſuperior tribunal is always a Tartar born. Though China is governed by Tartar princes, the latter ſeem to beſtow much more care and attention on the Chineſe than their own natural ſubjects. Should any diſpute ariſe between a Chineſe and a Tartar, the former muſt have greatly deviated from the rules of juſtice, if he is not acquitted, even by thoſe tribunals which are compoſed of half Chineſe and half Tartars. The ſlighteſt fault committed by a Tartar mandarin is always ſeverely puniſhed; but the puniſhment of the greateſt is often mitigated if the delinquent be a Chineſe; and the ſame ſeverity is exerciſed towards thoſe of the military department. Thoſe faults, however, are puniſhed with the greateſt ſeverity which hurt the intereſts of the people; for which reaſon they ſeldom fall ſacrifices to that claſs of petty tyrants who in other countries prey upon and devour them. None of the courts above deſcribed, however, has abſolute authority even in its own juriſdiction; nor can its deciſions be carried into execution without the concurrence of another tribunal and ſometime for ſeveral others. The fourth tribunal, for inſtance, has indeed under its juriſdiction the whole troops of the empire; but the payment of them is entruſted with the ſecond, while the 6th has the care of the arms, tents, chariots, barks, and ſtores neceſſary for military operations; ſo that nothing relative to theſe can be put in execution without the concurrence of all the three tribunals. There are two other courts peculiar to China, beſides that of the *cenſors*. See § 27. The firſt is that of princes; and which, in conformity with its title, is compoſed of princes only. In the regiſters of this tribunal are inſcribed the names of all the children of the imperial family as ſoon as they are born, with the dignities which the emperor confers upon them. This is the only tribunal where the princes can be tried. The other tribunal is that of hiſtory, called by the Chineſe *han-lin-yvan*. It is compoſed of the greateſt and moſt learned geniuſes of China; who are entruſted with the education of the heir apparent to the throne, and the compilation of the general hiſtory of the empire. This laſt part of their office renders them formidable even to the emperor himſelf. From this body the mandarins of the firſt claſs, and the preſidents of the ſupreme claſs, are generally choſen. Every mandarin, who is a governor, either of a province or city, muſt inſtruct the people twice a month; and recommend to them the obſervance of certain rules, which are ſummed up in a few ſhort ſentences, and ſuch as no perſon can ever be ſuppoſed to forget.

(6.) **CHINA, HISTOSY, FABULOUS, OF.** The origin of moſt nations is involved in obſcurity and fable; but that of the Chineſe much more ſo than any other. Every nation is inclined to aſſume too high an antiquity to itſelf, but the Chineſe carry theirs beyond all bounds. Indeed, though no people on earth are more exact in keeping records of every memorable tranſaction, yet ſuch is the genius of the Chineſe for ſuperſtition and fable, that the firſt part of their hiſtory is deſervedly contemned by every rational perſon. What contributes more to the uncertainty of the Chineſe hiſtory is, that neither we, nor they themſelves have any thing but fragments of their ancient hiſtorical books; all the books of the empire having been burnt, except thoſe written by lawyers and phyſicians, about A. A. C. 213. (See § 7.) The inaccuracy of the Chineſe annals is complained of even by their moſt reſpected author, CONFUCIUS; who affirms, that, before his time, many of the oldeſt materials for writing ſuch annals had been deſtroyed. According to the Chineſe hiſtories, the firſt monarch of the whole univerſe was called PUON-KU, or PUEN-CU. This, according to ſome, was the firſt man; but according to Bayer and Menzelius, two of the greateſt critics in Chineſe literature that have hitherto appeared, the word ſignifies "the higheſt antiquity." Puon-ku was ſucceeded by TIENE-HOANG, which ſignifies "the emperor of heaven." They call him alſo "the intelligent heaven, the ſupreme king of the middle heaven," &c. According to ſome of their hiſtorians, he was the inventor of letters, and of the Cyclic characters by which they determine the place of the year, &c. Tiene-hoang was ſucceeded by Ti-hoang (the emperor of the earth,) who divided the day and night, appointing 30 days to make one moon, and fixed the winter ſolſtice to the 11th moon. Ti-hoang was ſucceeded by Gine-hoang (ſovereign of men,) who with his nine brothers ſhared the government among them. They built cities, and ſurrounded them with walls; made a diſtinction between the ſovereign and ſubjects; inſtituted marriage, &c. The reigns of theſe 4 emperors make up one of what the Chineſe called *ki*, ages, or periods; of which there were 9 before Fo-hi, whom their moſt ſenſible people acknowledge as the founder of their empire. The hiſtory of the ſecond ki contradicts almoſt every thing ſaid of the firſt; for though we have but juſt now been told that Gine-hoang and his brethren built cities ſurrounded with walls; yet, in the ſucceeding age, the people dwelt in caves, or perched upon trees as it were in neſts. Of the third ki we hear nothing; and in the 4th, it ſeems matters had been ſtill worſe, as we are told that men were then only taught to retire into the hollows of rocks. Of the 5th and 6th we have no accounts. Theſe ſix periods, according to ſome writers, contained 90,000 years; according to others, 1,100,750. In the 7th and 8th ki, they tell us over again what they had ſaid of the firſt; namely, that men began to leave their caves and dwell in houſes, and were taught to prepare clothes, &c. Tchine-fang, the firſt monarch of the 8th *ki*, taught his ſubjects to take off the hair from ſkins with rollers of wood, and cover themſelves with the ſkins ſo prepared. He taught alſo to make a kind of web of their hair, to ſerve as a covering to their heads againſt rain. They obeyed his orders with joy, and he called his ſubjects "people cloathed with ſkins." His reign laſted 350 years; that of one of his ſucceſſors, named Yeou-tſao-chi, laſted more than 300; and his family continued for 12 or 18,000 years. But what is very ſurpriſing, all theſe thouſands and millions of years had elapſed without mankind's having any knowledge of fire. This was not diſcovered till towards the cloſe of this period, by one Souigine. After ſo uſeful a diſcovery, he taught the people to dreſs their victuals; whereas before, they had devoured the fleſh of animals quite raw, drank their blood and ſwallowed even their hair and feathers. He is alſo ſaid to have been the inventor of fiſhing, letters, &c. In the 9th period, we find the invention, or at leaſt the origin of letters, attributed to one TSANGHIE, who received them from a divine tortoiſe that carried them on his ſhell, and delivered them into the hands of Tſang-hie. During this period alſo, muſic, money, carriages, merchandize, and commerce, &c. were invented. There are various calculations of the length of theſe periods. Some make the time from Puan ku to Confucius, who flouriſhed about A. A. C. 479, to contain 279,000 years; others, 2,276,000; ſome, 2,759,860 years; others, 3,276,000; and ſome no leſs than 96,961,740 years. Theſe extravagant accounts are by ſome thought to contain obſcure and imperfect hints concerning the coſmogony and creation of the world, &c. Puon-ku, the firſt emperor, they think, repreſents eternity preceding the duration of the world. The ſucceeding ones, Tiene-hoang, Ti-hoang, and Giue-hoang, they imagine, ſignify the creation of the heaven and earth, and the formation of man. The ten *ki*, or ages, nine of which preceded Fo-hi, mean the ten generations preceding Noah. This may very poſſibly be the caſe; for about A. A. C. 300, ſome Jews travelled into China, who might have made the Moſaic writings known there.

(7.) **CHINA, HISTORY OF, TO THE BUILDING**

OF THE GREAT WALL. The above is the ſubſtance of that part of the Chineſe hiſtory which is entirely fabulous. After the 9 *ki* or ages above-mentioned, the 10th commenced with Fo-hi; and the hiſtory, though ſtill very dark, obſcure, and partly very fabulous, begins to grow ſomewhat more conſiſtent and intelligible. Fo-hi was born in the province of Shenſi. His mother walking upon the bank of a lake in that province, ſaw a very large print of a man's foot in the ſand there; and, being ſurrounded by an iris or rainbow, became impregnated. The child was named FO-HI; and, when he grew up, was by his countrymen elected king on account of his ſuperior merit, and ſtyled *Tyent-tſe*, that is, "the ſon of heaven." He invented the 8 *qua*, or ſymbols, conſiſting of 3 lines each, which, differently combined, formed 64 characters that were made uſe of to expreſs every thing. To give theſe the greater credit, he pretended that he had ſeen them inſcribed on the back of a dragon-horſe (an animal ſhaped like a horſe, with the wings and ſcales of a dragon,) which aroſe from the bottom of a lake. Having gained great reputation among his countrymen by this prodigy, he is ſaid to have created mandarins or officers, under the names of *dragons;* whence the emperors ſtill carry a dragon in their banners. He alſo inſtituted marriage, invented muſic, &c. Having eſtabliſhed a prime miniſter, he divided the government of his dominions among 4 mandarins, and died after a reign of 115 years. After Fo-hi followed a ſeries of emperors, of whom nothing remarkable is recorded, except that in the reign of YAU, the 7th after Fo-hi, the ſun did not ſet for ten days. This event the compilers of the Univerſal Hiſtory take to be the ſame with that mentioned in the book of Joſhua, when the ſun and moon ſtood ſtill for about a day. Fo-hi, they ſuppoſe to be the ſame with Noah: that after the deluge, he remained ſome time with his deſcendents; but that, on their combination to build the tower of Babel, he ſeparated himſelf with as many as he could perſuade to go along with him; and that, travelling eaſtward, he at laſt entered the fertile country of China, and laid the foundation of that vaſt empire. As the Chineſe, contrary to the practice of almoſt all nations, have never ſought to conquer other countries, their hiſtory for many ages furniſhes nothing remarkable. The whole of their emperors, (excluding thoſe of the fabulous times,) are comprehended in 22 dynaſties, enumerated in the following table:

CHINESE DYNASTIES.

	Emperors.	A. A. C.
1. Hya, containing	17	2207.
2. Shang, or Ing,	28	1766.
3. Chew,	35	1122.
4. Tſin,	4	248.
5. Han,	25	206.
		A. D.
6. Hew-han,	2	220.
7. Tſin,	15	465.
8. Song,	8	220.
9. Tſi,	5	479.
10. Lyang,	4	502.
11. Chin,	4	557.
12. Swi,	3	
13. Twang,	20	618.
14. Hew-lyang,	2	907.
15. Hew-tang,	4	923.
16. Hew-tſin,	2	936.
17. Hew-han,	2	947.
18. Hew-chew,	3	951.
19. Song,	18	960.
20. Ywen,	9	1280.
21. Ming,	16	1368.
22. Tſing,		1645.

This table is formed according to the accounts of Du Halde, the Jeſuit, and is commonly reckoned the moſt authentic; but according to the compilers of the Univerſal Hiſtory, who make YAU cotemporary with Joſhua, the dynaſty of HYA did not commence till A. A. C. 1357; and to accommodate the hiſtory to their hypotheſis, great alterations muſt be made in the duration of the dynaſties. The moſt intereſting particulars of the Chineſe hiſtory relate only to the incurſions of the Tartars, who at laſt conquered the whole empire, and who ſtill continue to hold the ſovereignty; though, by transferring the ſeat of the empire to Peking, and adopting the Chineſe language, manners, &c. Tartary would ſeem rather to have been conquered by China, than China by Tartary. Theſe incurſions are ſaid to have begun very early; even in the time of SHUN, ſucceſſor to Yau. At this time, the Tartars were repulſed, and obliged to retire into their own territories. They continued, however, to threaten the empire with invaſions, and the northern provinces were often ravaged by the Tartars in the neighbourhood. About A. A. C. 213, Shi-whang-ti, having ſubdued all the kings of the different provinces, became ſole emperor of China. He divided the empire into 36 provinces; and finding the N. part much incommoded by the barbarians, he ſent a formidable army againſt them, which drove them far beyond the boundaries of China. To prevent their return, he built the famous wall, (§ 40.) which ſeparates China from Tartary. After this, being elated with his own exploits, he formed a deſign of making poſterity believe, that he had been the firſt Chineſe emperor that ever ſat on the throne. For this purpoſe, the tyrant ordered all the hiſtorical writings to be burnt, and cauſed many of the learned men to be buried alive, leſt they ſhould have committed to writing, from their memories, any part of the former hiſtory of the empire.

(8.) CHINA, HISTORY OF; TO THE EXPULSION OF THE KITAN TARTARS. What effect the great wall for ſome time had in preventing the invaſions of the Tartars, we are not told; but in the 10th century of the Chriſtian æra, thoſe of KITAN or Lyau got a footing in China. The Kitan were a people of eaſtern Tartary, who dwelt N. and NE. of the province of Pecheli, particularly in that of Lyau-tong lying without the great wall. Having ſubdued the country between Korea and Kaſhgar, they became much more troubleſome to the Chineſe than all the other Tartars. Their empire commenced about A. D. 916, in the 4th year of Mo-ti-kyan-ti, 2d emperor of the 14th Chineſe dynaſty. In 946. Mingt-ſong, 2d emperor of the 15th dyſtany, be ing dead, Sheking-tang, his ſon-in-law, rebelled againſt Mingt-ſong, his ſon and ſucceſſor, whom he deprived of his crown and life. This he accompliſhed by means of an army of 50,000 men furniſhed by the Kitan. Fi-ti, the ſon of Mingt-ſong, being unable to reſiſt the uſurper, fled to the city Ghey-chew; where he ſet fire to his palace, and burnt himſelf, with his family and all his valuable effects. On his death, Sheking-tang aſſumed the title of emperor; founded the 16th dynaſty; and changed his name to KAUT-SU. But the Kitan general refuſing to acknowledge him, he was obliged to purchaſe a peace, by yielding up to the Tartars 16 cities in Pecheli, beſides a yearly payment of 300,000 pieces of ſilk. This ſubmiſſion ſerved only to inflame the avarice and ambition of the Kitan. In 959, they broke the treaty, and invaded the empire afreſh. Tſi-vang, then emperor, oppoſed them with a formidable army; but through the treachery of his general Lyew-chi-ywen, the Tartars took him priſoner. On this, Tſi-vang was glad to recover his liberty by accepting a ſmall principality; while the traitor became emperor of all China, and, changing his name to *Kaut-ſu*, founded the 17th dynaſty. The Tartars in the mean time ravaged all the northern provinces without oppoſition, and carried off much plunder. In 962, Kaut-ſu dying was ſucceeded by his ſon In-ti, whoſe youth gave an opportunity to the eunuchs to raiſe commotions; eſpecially as the army was employed at a diſtance in repelling the invaſions of the Tartars. This army was commanded by Ko-ghey, who defeated the enemy in ſeveral battles, and thus reſtored peace to the northern provinces. In the mean time, In-ti was ſlain by his eunuchs, and the empreſs placed his brother on the throne; but Ko-ghey, returning in triumph, was ſaluted emperor by his victorious army, and the empreſs was obliged to ſubmit, while Ko-ghey, aſſuming the name of TAY-TSU, founded the 18th dynaſty. Nine years after this, however, the grandees of the empire, ſetting aſide Kong-ti, the 3d in ſucceſſion from Tay-tſu, on account of his non-age, proclaimed his guardian, named *Chau-quang-yu*, emperor; who, aſſuming the name of Kau-tſu, founded the 19th dynaſty, called Song, or TSONG. Under this monarch the empire began to recover; but the Kitan ſtill continued their incurſions. The ſucceſſors of Kau-tſu oppoſed them with various ſucceſs; but at laſt, in 978, the barbarians became ſo ſtrong as to lay ſiege to a conſiderable city. Tay-tſong, ſucceſſor to Kau-tſu, detached 300 ſoldiers, each carrying a light in his hand, againſt them in the night.—The barbarians, imagining, from the number of lights, that the whole Chineſe army was at hand, immediately fled, and, falling into the ambuſcades laid for them by the Chineſe general, were almoſt all cut to pieces. This check, however, did not long ſtop the ravages of the Kitan. In A. D. 999, they laid ſiege to a city in Pecheli; but Ching-tſong, ſucceſſor to Tay-tſong, came upon them with his army ſo ſuddenly, that they betook themſelves to flight. But inſtead of purſuing this victory, he bought a peace, by conſenting to pay annually 100,000 tael (about L. 34,000), and 200,000 pieces of ſilk. The youth and pacific diſpoſition of Jin-tſong, ſucceſſor to Ching-tſong, revived the courage of the Kitan; and, in 1055, war would have been renewed, had not the emperor concluded another ſhameful treaty with them. Two years after, the Tartars demanded reſtitution of ten cities in Pecheli, which had been taken by Ko-ghey; upon which Jin-tſong engaged to pay them an annual tribute of 200,000 taels of ſilver, and 300,000 pieces of ſilk in lieu of their cities. From this time, the Kitan remained in peaceable poſſeſſion of their Chineſe dominions till A. D. 1117. Whey-tſong, at that time emperor, being able neither to bear their ravages, nor by himſelf to put a ſtop to them, reſolved upon a remedy which at laſt proved worſe than the diſeaſe. This was to call in the Nu-che, Nyu-che, or Eaſtern Tartars, to deſtroy the kingdom of the Kitan. Joining his forces to thoſe of the Nu-che, the Kitan were every where defeated; and at laſt reduced to ſuch extremity, that thoſe who remained were forced to leave their country, and fly to the mountains of the weſt.

(9.) CHINA, HISTORY OF, TO THE INVASION BY JENGHIZ KHAN. The empire of Kitan was thus totally deſtroyed, but nothing to the advantage of the Chineſe; for the Tartar general, elated with his conqueſt, gave the name of *Kin* to his new dominion, aſſumed the title of emperor, and broke the treaties concluded with the Chineſe emperor; and, invading the provinces of Pecheli and Shen-ſi, made himſelf maſter of the greater part of them. Whey-tſong, finding himſelf in danger of loſing his dominions, made ſeveral advantageous propoſals to the Tartar; who, ſeeming to comply with them, invited him to come and ſettle matters by a perſonal conference. The Chineſe monarch complied; but, on his return, the terms agreed upon ſeemed intolerable to his miniſters; who thought the moſt cruel war preferable to ſuch an ignominious peace. The Kin monarch, being informed of this, took ſeveral cities. Whey-tſong was weak enough to go in perſon to hold a ſecond conference; but, on his arrival, was immediately ſeized by the Tartars. He was kept a priſoner under a ſtrong guard during the remaining part of his life; and ended his days in 1126, in the deſert of Shamo, having nominated his eldeſt ſon Kin-tſong to ſucceed him. Kin-tſong began his reign with putting to death ſix miniſters of ſtate, who had betrayed his father into the hands of the Kin Tartars. The barbarians in the mean time purſued their conqueſts; croſſed the Yellow River, which an handful of troops might have prevented; and took and plundered the imperial city. Then ſeizing the emperor and his conſort, they carried them away captives: but many of the principal lords, and ſeveral of the miniſters, preferring death to ſuch an ignominious bondage, killed themſelves. The Kin being informed by the empreſs *Meng*, that ſhe had been divorced, they left her behind. This proved the means of ſaving the empire; for by her prudence ſhe got the crown placed on the head of Kau-tſong, 9th ſon of the emperor Whey-tſong. Kau-tſong fixed his court at Nanking, and made ſeveral efforts to recover ſome of his provinces from the Kin, but without effect. Hi-tſong the Kin monarch [illegible] voured to gain the eſteem of his Chineſe ſub by paying regard to their learned men, and honouring the memory of Confucius. Some time after he advanced to Nanking, from whence Kau-tſong had retired, and took it: but, receiving advice that Yo-ſi, general of the Song, or ſouthern Chineſe, was advancing by long marches to the relief of that city, he ſet fire to the palace, and retired northward. Yo-ſi, however, arrived time enough to fall upon the rear-guard, which ſuffered very much; and from this time the Kin never dared to croſs the river Kyang. In a few years after, the Chineſe emperor became tributary to the Kin, and concluded a peace upon very diſhonourable terms. This ſubmiſſion, however, was of little avail: for, in 1163, the Tartars broke the peace; and, invading the ſouthern province with a formidable army, took the city of Yang-chew. The king, having approached the river Kyang, near its mouth, where it is wideſt as well as moſt rapid, commanded his troops to croſs it, threatening with his drawn ſword to kill thoſe who refuſed. On this the whole army mutinied; and the king being killed in the tumult, the army immediately retired. From this time nothing remarkable occurs in the Chineſe hiſtory, till 1210, when Jenghiz khan, chief of the Moguls, quarrelled with Yong-tſi emperor of the Kin; and at the ſame time the king of Hya, diſguſted at being refuſed aſſiſtance againſt Jenghiz khan, threatened him with an invaſion on the weſt ſide. Yong-tſi prepared for his defence; but in 1211, receiving news that Jenghiz khan was advancing ſouthward with his whole army, he made propoſals of peace, which were rejected. In 1212, the Mogul general forced the great wall; or, according to ſome writers, had one of the gates treacherouſly opened, and made incurſions as far as Peking the capital of the Kin empire. At the ſame time the province of Lyau-tong was almoſt totally reduced by ſeveral Kitan lords who had joined Jenghiz khan; ſeveral ſtrong places were taken, and an army of 300,000 Kin defeated by the Moguls. In autumn they laid ſiege to the city of Taytong-ſu; where, although the governor Hujaku fled, yet Jenghiz khan met with conſiderable reſiſtance. Having loſt a vaſt number of men, and being himſelf wounded by an arrow, he was obliged to raiſe the ſiege and retire into Tartary; after which the Kin retook ſeveral cities. The next year, however, Jenghiz khan re-entered China; retook the cities which the Kin had reduced the year before; and overthrew their armies in two bloody battles, in one of which the ground was ſtrewed with dead bodies for upwards of four leagues. The ſame year Yong-tſi was ſlain by his general Hujaku; and Sun, a prince of the blood, advanced in his room. After this the Moguls, attacking the empire with 4 armies at once, laid waſte Shanſi, Honan, Pecheli, and Shantong. In 1214, Jenghiz khan ſat down before Peking; but inſtead of aſſaulting the city, offered terms of peace, which were accepted, and the Moguls retired into Tartary.

(10.) **China, history of, to the overthrow of the Kin Dynasty.** The emperor, leaving his ſon at Peking, removed the court to Pyen-lyang near Kayſong-fu, the capital of Honan. At this Jenghiz khan being offended, immediately ſent troops to beſiege Peking; which held out till May 1215, and then ſurrendered. At the ſame time the Moguls finiſhed the conqueſt of Lyau-tong; and the Song refuſed to pay the uſual tribute to the Kin. In 1216, Jenghiz khan returned to purſue his conqueſts in the W. of Aſia, where he ſtaid 7 years; during which time his general Muhuli made great progreſs in China againſt the Kin emperor. He was much aſſiſted by the motions of Ning-tſong emperor of the Song; who, incenſed by the frequent perfidies of the Kin, had declared war againſt them, and would hearken to no terms of peace. Notwithſtanding this, however, in 1220, the Kin, exerting themſelves, raiſed two great armies in Shenſi, and Shang-ton: The former baffled the attempts of the Song and the king of Hya, who had united againſt them; but the latter, though no fewer than 200,000, were entirely defeated by Muhuli. In 1221, that officer paſſed the Whang-ho, and died after conquering ſeveral cities. In 1224, the Kin emperor died; and was ſucceeded by his ſon Shew, who made peace with the king of Hya: but next year that kingdom was entirely deſtroyed by Jenghiz khan. In 1226, Oktay ſon to Jenghiz khan, marched into Honan, and beſieged Kay-Song-fu, capital of the Kin empire; but was obliged to withdraw into Shenſi, where he took ſeveral cities, and cut in pieces an army of 30,000 men. In 1227 Jenghiz khan died, after having deſired his ſons to demand a paſſage for their army through the dominions of the Song, without which, he ſaid, they could not eaſily vanquiſh the Kin. The war was carried on with various ſucceſs; but though the Moguls took above 60 important poſts in Shenſi, they found it impoſſible to force Tong-quan. In April 1231, they took the capital of Shenſi, and defeated the Kin army which came to its relief. Hereupon Toley, the brother of Oktay, having aſſembled all his forces, ſent a meſſenger to the Song generals to demand a paſſage through their territories. This, however, they not only refuſed, but put the meſſenger to death; which ſo enraged Toley, that he ſwore to make them repent of it, and was ſoon as good as his word. He decamped in Auguſt 1231; and having forced the paſſages, put to the ſword the inhabitants of Wha-yang and Fong-chew, two cities in the diſtrict of Han-chong-fu. Then having cut down rocks to fill up deep abyſſes, and make roads through places almoſt inacceſſible, he beſieged the city of Han-chong-fu itſelf. The miſerable inhabitants fled to the mountains on his approach, and more than 100,000 of them periſhed. After this, he divided his forces, conſiſting of 30,000 horſe, into two bodies. One of theſe went weſtward to Myen-chew: from thence, after opening the paſſages of the mountains, they arrived at the river Kyaling. This they croſſed on rafts made of the wood of demoliſhed houſes; and then, marching along its banks, ſeized many important poſts, and deſtroyed more than 140 cities, towns, and fortreſſes. The ſecond detachment ſeized an important poſt in the mountains, called *Tautong*, 6 or 7 leagues E. of Han-chong-fu. On the other ſide Oktay advanced in Oct. towards Pu-chew a city of Shan-ſi; which being taken, he prepared to paſs the Whang-ho. Toley, after ſurmounting incredible difficulties, arrived in Dec. on the borders of Honan, and made as if he deſigned to attack the capital. On his firſt appearance in Honan, through a paſſage ſo little ſuſpected, all were filled with terror, ſo that he proceeded for ſome time without oppoſition. At laſt the emperor ordered his generals, Hota, Ilapua, &c. to march againſt the enemy. Toley boldly attacked them; but was obliged to retire. Hota was for purſuing him, but Ilapua, was of opinion, that, as the Moguls were incloſed between the rivers Han and Whang-ho, they could not eſcape. This negligence they ſoon had occaſion to repent of; for Toley made himſelf maſter of their heavy baggage; which obliged them to retire to Tang-chew. From thence they ſent a meſſenger to acquaint the emperor that they had gained the battle, but concealed the loſs of their baggage. This filled the court with joy; and the people who had retired into the capital for its defence, left it again, and went into the country: but, in a few days after, the vanguard of the Moguls, ſent by the emperor Oktay, carried off a great number of thoſe that had quitted the city. In Jan. 1232, Oktay paſſing the Whang-ho, encamped in the diſtrict of Kay-ſong-fu, capital of the Kin empire, and ſent his general Suputay to beſiege the city. The place was near 30 miles in circumference; but having only 40,000 ſoldiers to defend it, as many more from the neighbouring cities, and 20,000 peaſants, were ordered into it; while the emperor publiſhed an affecting declaration, animating the people to defend it to the laſt extremity. Oktay, having heard with joy of Toley's entrance into Honan, ordered him to ſend ſuccours to Suputay. On the other hand, the Kin generals advanced with 150,000 men to relieve the city; but being obliged to divide their forces to avoid in part the great road which Toley had obſtructed with trees, they were attacked by him at a diſadvantage; and after a faint reſiſtance, defeated with great ſlaughter, and the loſs of both their generals, one killed and the other taken. The emperor now ordered the army at Tong-quan and other fortified places to march to the relief of Kay-ſong-fu. They aſſembled accordingly, to the number 110,000 foot and 15,000 horſe; and were followed by vaſt numbers of people who expected to be thus protected from the enemy. But many of theſe troops having deſerted, and the reſt being enfeebled by the fatigues of their march, they diſperſed on the approach of their purſuers, who killed all they found in the highways. After this the Moguls took Ton-quan and ſome other poſts; but were obliged to raiſe the ſieges of Quey te-fu and Loyang, by the bravery of the governors. Kyang-ſhin, governor of Loyang, had only about 4000 ſoldiers under him, while his enemies were 30,000 ſtrong. He placed his worſt ſoldiers on the walls, putting himſelf at the head of 400 brave men; whom he ordered to go naked, and whom he led to all dangerous attacks. He invented engines to caſt large ſtones, which required but few hands to play them, and aimed ſo true as to hit at 100 paces diſtance. When their arrows failed, he cut thoſe of the enemy into 4 pieces; pointed them with pieces of braſs coin; and diſcharged them from wooden tubes with as much force as bullets from a muſket. Thus he haraſſed the Moguls for 3 months ſo grievouſly, that they were obliged, notwithſtanding their numbers, to abandon the enterprize. Oktay, at laſt, notwithſtanding his ſucceſſes, reſolved to return to Tartary; and offered the Kin emperor peace, provided he became tributary, and delivered up to him 27 families which he named. Theſe offers were very agreeable to the emperor, and peace was at laſt concluded; though Suputay, taking no notice of the treaty, puſhed on the ſiege of the capital with more vigour than ever, for 16 days and nights without intermiſſion, during which an incredible number of men periſhed on both ſides. Soon after, the plague began in Kay-ſong-fu; and raged with ſuch violence, that, in 50 days, 900,000 biers were carried out, beſides a vaſt multitude of the poorer ſort who could not afford any. In a ſhort time, two unlucky accidents occaſioned a renewal of the war. Gan-yong, a young Mogul lord, having aſſumed the government of ſome cities in Kyang-nan, and killed the officer ſent to take poſſeſſion of them, declared for the Kin. The emperor unwarily took Gan-yong into his ſervice, and gave him the title of prince. Upon this Oktay ſent an envoy, attended by 30 other perſons, to inquire into the affair; but the Kin officers killed them all, without being puniſhed by the emperor. Suputay, having informed his maſter of all theſe proceedings, was ordered to renew the war in Honan. Shew-fu now commanded his officers to unite their troops for the defence of the capital; but before his orders could be obeyed, they were attacked, and defeated, one after another, by the Moguls. This obliged him to raiſe ſoldiers from among the peaſants, for whoſe ſubſiſtence the people were taxed 3 tenths of the rice they poſſeſſed. The city began now to be diſtreſſed for want of proviſions; and as it was in a bad poſture of defence, the emperor marched with an army againſt the Moguls. His expedition proved unfortunate; for, ſending part of his army to beſiege the city, Whey-chew, it was totally cut off, and Suputay a 2d time ſat down before the capital. On hearing this, the emperor repaſſed the Whang-ho, and retired to Quey-te-fu. Here he had not been long before the capital was betrayed, and Suputay put all the males of the imperial race to death; but, by the expreſs command of Oktay, ſpared the inhabitants, who amounted to 1,400,000 families. After this diſaſter, the unhappy monarch left his troops at Quey-te-fu, and retired to Juning-fu, attended only by 400 perſons. Here the diſtance of the Moguls made him think of living at eaſe; but while he flattered himſelf with theſe vain hopes, the enemy's army arrived before the city and inveſted it. The garriſon were terrified at their approach; but were encouraged by the emperor, and his brave general Hu-ſye-hu, to hold out to the laſt. As there were not in the city a ſufficient number of men, the women, dreſſed in men's clothes, were employed to carry wood, ſtones, and other neceſſary materials to the walls. All their efforts, however, were ineffectual. They were reduced to ſuch extremities, that for three months they fed on human fleſh; killing the old and feeble, as well as many priſoners, for food. The Moguls, hearing of this, made a general aſſault, in Jan. 1234; which continued from morning till night; but at laſt the aſſailants were repulſed. In this action, however, the Kin loſt all their beſt officers; upon which the emperor reſigned the crown to Cheng-lin, a prince of the blood. Next morning, while the ceremony of inveſting the new emperor was performing, the enemy mounted the S. walls, and the S. gate being abandoned, the whole army broke in. They were oppoſed, however, by Hu-ſye-hu; who, with 1000 ſoldiers, continued to fight with amazing intrepidity. In the mean time Shew-fu, ſeeing every thing irreparably loſt, lodged the ſeal of the empire in a houſe and then cauſing ſheaves of ſtraw to be ſet round it, ordered it to be ſet on fire as ſoon as he was dead. After giving this order he hanged himſelf, and his commands were executed by his domeſtics. Hu-ſye-hu, who ſtill continued fighting with great bravery, no ſooner heard of the tragical death of the emperor, than he drowned himſelf in the river Ju; as did alſo 500 of his moſt reſolute ſoldiers. The ſame day the new emperor, Cheng-lin, was ſlain in a tumult; and thus an end was put to the dominion of the Kin Tartars in China.

(11.) **China, history of, to the overthrow of the Song Dynasty.** The empire of China was now to be ſhared between the Song or ſouthern Chineſe, and the Moguls. It had been agreed upon, that the province of Honan ſhould be delivered up to the Song as ſoon as the war was finiſhed. But they, without waiting for the expiration of the term, or giving Oktay notice of their proceedings, introduced their troops into Kay-ſong-fu, Lo-yang, and other conſiderable cites. On this the Mogul general reſolved to attack them; and repaſſing the Whang-ho, cut off part of the garriſon of Lo-yang, while they were out in ſearch of proviſions. The garriſon of Kay-ſong-fu likewiſe abandoned that place; and the Song emperor degraded the officers who had been guilty of thoſe irregularities, ſending ambaſſadors to Oktay, at the ſame time, to deſire a continuance of the peace. What Oktay's anſwer was we are not told, but the event ſhowed that he was not well pleaſed; for, in 1235, he ordered his ſecond ſon prince Kotovan, and his general Chahay, to attack the Song in Se-chwen, while others marched towards the borders of Kyang-nan. In 1236, the Moguls made great progreſs in the province of Huquang, where they took ſeveral cities, and put vaſt numbers to the ſword. This year they introduced paper or ſilk money, which had formerly been uſed by Chang-tſong, 6th emperor of the Kin. Prince Kotovan forced the paſſages into the diſtrict of Hang-chon-fu in Shenſi, which he entered with an army of 500,000 men. Here a terrible battle was fought between the vaſt army of the Moguls and the Chineſe troops, who had been driven from the paſſages they defended. The latter conſiſted only of 10,000 horſe and foot, who were almoſt entirely cut off; and the Moguls loſt ſuch a number of men, that blood is ſaid to have run for two leagues together. After this victory the Moguls entered Se-chwen, where they committed ſuch barbarities, that in one city, 40,000 people choſe rather to put an end to their own lives, than ſubmit to ſuch cruel conquerors. In 1237, the Moguls received a conſiderable check before Gantong, the ſiege of which they were obliged to raiſe with loſs. In 1238 they beſieged Lu-chew, in the ſame province. They ſurrounded it with a rampart of earth and a double ditch; but the Chineſe general ordered their entrenchments to be filled with immenſe quantities of herbs ſteeped in oil, and then ſet on fire, while he ſhot ſtones upon them from a tower 7 ſtories high. At the ſame time a vigorous ſally was made; and the Mogul army being thrown into the utmoſt diſorder, were obliged to abandon the ſiege, and retire northwards. In 1239, theſe barbarians were oppoſed by a general called Meng-kong, with great ſucceſs; who, this and the following year, gained great honour by his exploits. While he lived, the Moguls were never able to make any conſiderable progreſs; but his death, in 1246, proved of the greateſt detriment to the Chineſe affairs; and ſoon after, the Tartars renewed the war with more vigour and ſucceſs than ever. In 1255, they re-entered the province of Se-chwen; but ſtill met with vigorous oppoſition. Though the Chineſe were always beaten, being greatly inferior in number to their enemies, yet they generally retook the cities the Moguls had reduced, as the latter were commonly obliged to withdraw for want of proviſions and forage. In 1259, they undertook the ſiege of Ho-chew, a ſtrong city to the weſt of Peking, defended by Vang-kyen, a very able officer, who commanded a numerous garriſon. The ſiege continued from Feb. till Aug. during which time the Moguls loſt an immenſe number of men. On the 10th of Aug. they made a general aſſault in the night. They mounted the walls before the governor had intelligence; but were ſoon attacked with the utmoſt fury. The Mogul emperor, Meng-ko, himſelf came to the ſcalade; but the ſcaling ladders of the Moguls being blown down by a ſtorm, a terrible ſlaughter enſued, and amongſt the reſt fell the emperor himſelf. Upon this the Mogul generals raiſed the ſiege, and retired towards Shen-ſi. On the death of Meng-ko, Hupilay, or Kublay Khan who ſucceeded him, laid ſiege to Vu-chang-fu, a city near the capital of the Song empire. At this the emperor being greatly alarmed, diſtributed immenſe ſums among his troops; and, having raiſed a formidable army, marched to the relief of Vu-chang-fu. Unfortunately the command of this army was committed to the care of Kya-tſe-tau, a man without either courage or experience. The ſiege of Vu-chang-fu was commenced, and had continued a conſiderable time, when Kya-tſe-tau, made propoſals of peace. A treaty was accordingly concluded, by which Kya-tſe-tau engaged to pay an annual tribute of about L.50,000 in ſilver, and as much in ſilk; acknowledging likewiſe the ſovereignty of the Moguls over the Song empire. In conſequence of this treaty, the Moguls retreated, after the boundaries of the two empires had been fixed, and repaſſed the Kyang; but 170 of them having ſtaid on the other ſide of the river, were put to death by Kya-tſe-tau. This wicked miniſter totally concealed from the emperor his having made ſuch a ſhameful treaty with the Moguls; and the maſſacre of the 170 ſoldiers raiſed a report that the enemy had been defeated; ſo that the Song court believed that they had been compelled to retreat by Kya-tſe-tan. This proved the ruin of the empire; for, in 1260, the Mogul emperor ſent Hauking to the Chineſe court to execute the treaty according to terms agreed on with Kya-tſe-tau. The miniſter, dreading the arrival of this envoy, impriſoned him near Nanking; and took care that neither Hupilay, nor Li-tſong the Chineſe emperor, ſhould hear any thing of him. Such unparalleled conduct could not fail to produce a new war. Hoſtilities were accordingly renewed in 1268. The Mogul army amounted to 300,000 men; but little progreſs was made till 1271. Syan-yang and Fan-ching, cities in Se-chew had been long beſieged ineffectually, till Hupilay ſent for two engineers out of the weſt, who knew how to caſt ſtones of 150 pounds weight out of their engines, which made holes of 7 or 8 feet wide in the ſtrongeſt walls. In the beginning of 1273, they planted their engines againſt Fanching, and preſently made a breach in the walls. After a bloody conflict the Moguls made themſelves maſters of the ſuburbs, walls, and gates of the city; but a Chineſe officer, with only 100 ſoldiers, reſolved to fight from ſtreet to ſtreet. This he did for a long time with the greateſt obſtinacy killing vaſt numbers of the Moguls; and both parties are ſaid to have been ſo much overcome with thirſt, that they drank human blood to quench it. The Chineſe ſet fire to the houſes, that the great beams, falling down, might embaraſs their purſuers; but at laſt being quite wearied out they put an end to their own lives. After the taking of Fanching, all the materials which had ſerved at the ſiege were tranſported to Seyen-yang. The two engineers poſted themſelves againſt a wooden entrenchment raiſed on the ramparts which they quickly demoliſhed; and the beſieged were ſo intimidated by theſe terrible engines, that they immediately ſurrendered. In 1274, Pe-yen, an officer of great valour and humanity, was promoted to the command of the Mogul army. His firſt exploits were the taking of two ſtrong cities; after which he paſſed the Ky-ang, defeated the Song army, and laid ſiege to Vu-chang-fu. This city ſoon ſurrendered, and Pe-yen, by reſtraining the barbarity of his ſoldiers, gained the hearts of the Chineſe ſo much, that ſeveral cities ſurrendered to him on the firſt ſummons. In the mean time the treacherous Kya-tſe-tau, who was ſent to oppoſe Pe-yen, propoſed peace on the terms he had formerly concluded with Hupilay; but theſe being rejected, he was obliged to come to an engagement. In this he was defeated, and Pe-yen continued his conqueſts with great rapidity. Having taken Nanking, and ſome other cities he marched towards Hang-chew-fu, the capital of the Song empire. Peace was now again propoſed but rejected; and at laſt the empreſs was conſtrained to put herſelf, with her ſon, then an infant, into the hands of Pe-yen, who immediately ſent them to Hupilay. The ſubmiſſion of the empreſs did not yet put an end to the war. Many of the chief officers ſwore to do their utmoſt to reſcue her from the hands of her enemies. In conſequence of this reſolution, they diſtributed their money among the ſoldiers, and ſoon got together an army of 40,000 men. This army attacked the city where the young emperor Kongtſong was lodged, but without ſucceſs; after which, they raiſed one of his brothers to the throne, who took the name of Twon-tſong. He was only 9 years of age, and enjoyed it but a very ſhort time. In 1277 he was in great danger of periſhing, the ſhip on board which he then was being caſt away. The poor prince fell into the water, and was taken up half dead with the fright. A great part of his troops periſhed at that time, and he ſoon after made offers of ſubmiſſion to Hupilay. Theſe, however, were not accepted; and in 1278, he retired into a deſart iſland on the coaſt of Quan-tong, where he died in the 11th year of his age. On this the mandarins raiſed to the throne his brother, Te-ping, then only 8 years of age. His army conſiſted of no fewer than 200,000 men; but being utterly void of diſcipline, and experience, they were defeated with 20,000 Mogul troops. Nor was the fleet more ſucceſsful: for being put in confuſion by that of the Moguls, and the emperor in danger of falling into their hands, one of the officers taking him on his ſhoulders, jumped with him into the ſea, where they were both drowned. Moſt of the mandarins followed this example, as did alſo the empreſs and miniſter, all the ladies, and multitudes of others, inſomuch that 100,000 people are ſaid to have periſhed that day. Thus ended the Chineſe race of emperors: and the Mogul dynaſty, known by the name of *Ywen*, commenced.

(12.) **CHINA, HISTORY OF, TO THE OVERTHROW OF THE YWEN DYNASTY.** Though no race of men that ever exiſted were more remarkable for cruelty and barbarity than the Moguls; yet the emperors of the Ywen dynaſty were not in any reſpect worſe than their predeceſſors. On the contrary, **HUPILAY**, by the Chineſe called **SHI-TSU**, found the way of reconciling the people to his government, and even of endearing himſelf to them ſo much, that the reign of his family is to this day ſtyled by the Chineſe *the wiſe government*. This he accompliſhed by keeping cloſe to their ancient laws and cuſtoms, by his mild and juſt government, and by his regard for their learned men. He was indeed aſhamed of the ignorance of his Mogul ſubjects, when compared with the Chineſe. The whole knowledge of the former was ſummed up in their ſkill in managing their arms and horſes, being perfectly ignorant of every art and ſcience. In 1279, he had cauſed the Mogul characters to be contrived. In 1280, he cauſed ſome mathematicians ſearch for the ſource of the river Whang-ho, which at that time was unknown to the Chineſe themſelves. In 4 months they arrived in the country where it riſes, and made a map of it. The ſame year a treatiſe on aſtronomy was publiſhed by his order; and, in 1282, he ordered the learned men to repair from all parts of the empire to examine the ſtate of literature, and take meaſures for its advancement. At his firſt acceſſion he fixed his reſidence at Tay-ywen-fu, the capital of Shen-ſi; but afterwards removed it to Peking. Here, being informed that the barks which brought to court the tribute of the ſouthern provinces, or carried on trade, were obliged to come by ſea, and often ſuffered ſhipwreck, he cauſed that celebrated canal to be made, which is at preſent one of the wonders of the Chineſe empire, being 300 leagues in length. By this canal above 9000 imperial barks tranſport with eaſe, and at ſmall expenſe, the tribute of grain, rice, ſilks, &c. which is annually paid to the court. In the 3d year of his reign Shi-tſu formed a deſign of reducing the iſlands of Japan, and the kingdoms of Tonquin and Cochin-china. But theſe enterpriſes ended unfortunately, but the firſt remarkably ſo; for of 100,000 perſons employed in it, only 4 or 5 eſcaped with the melancholy news of the deſtruction of the reſt, who all periſhed by ſhipwreck. Shi-tſu reigned 15 years, died in the 80th year of his age, and was ſucceeded by his grandſon. The throne continued in the Ywen family till 1367, when Shun-ti, the laſt of that dynaſty, was driven out by a Chineſe named Chu. During this period the Tartars had become enervated by long proſperity. Shun-ti, the reigning prince, was ſunk in ſloth and debauchery; and the empire was oppreſſed by a wicked miniſter, named Ama. In June 1355, Chu, a Chineſe of mean extraction, and head of a ſmall party, ſet out from How-chew, paſſed the Kyang, and took Tay-ping. He then aſſociated with ſome other malecontents, at the head of whom he reduced the town of Tu-chew, in Kyang-nan. Soon after he made himſelf maſter of Nanking, having defeated the Moguls who came to its relief. In Dec. 1356, he raiſed 100,000 men, at the head of whom he took the city of U-chew, in Quang-ſi; and here, aſſembling his generals, it was reſolved neither to ſlaughter nor to plunder. The moſt formidable enemy he had to deal with was *Chen-yew lyang*, ſtyled "emperor of the Han," who being grieved at the progreſs made by Chu, equipped a fleet, and raiſed a formidable army, to reduce Nan-chang-fu, a city of Kyang-ſi, which his antagoniſt had made himſelf maſter of. The governor, however, informed Chu of his danger; upon which that chief cauſed a fleet to be fitted out at Nanking, in which he embarked 200,000 ſoldiers. As ſoon as Chen-yew-lyang was informed of his enemy's approach, he raiſed the ſiege of Nan-chang-fu, and gave orders for attacking Chu's naval force. An engagement enſued between a part of the fleets, in which Chu proved victorious; and next day, all the ſquadrons having joined, in order to come to a general engagement, Chu gained a 2d victory, and burnt 100 of the enemy's veſſels. A 3d and 4th engagement happened, in both of which Chu gained the victory; and in the laſt, Chen-yew-lyang himſelf was killed, his ſon taken priſoner, and his generals obliged to ſurrender with all their forces and veſſels. In Jan. 1364, Chu's generals propoſed to have him proclaimed emperor; but this he declined, and at firſt contented himſelf with the title of king of *U*. In Feb. he made himſelf maſter of Vu-chang-fu, capital of Hu-quang; where, with his uſual humanity, he relieved thoſe in diſtreſs, encouraged the literati, and would allow his troops neither to plunder nor deſtroy. This wiſe conduct procured him an eaſy conqueſt both of Kyang-ſi and Hu-quang. The Chineſe ſubmitted to him in crowds and profeſſed the greateſt veneration and reſpect for his perſon and government. All this time Shun-ti, with an unaccountable negligence, never thought of exerting himſelf againſt Chu, but continued to employ his forces againſt the rebels who had taken up arms in various parts of the empire; ſo that Chu found himſelf in a condition to aſſume the title of emperor. This he did at Nanking on the 1ſt Jan. 1368. After this his troops entered Honan, which they preſently reduced. In the 3d month, Chu, who had now taken the name of *Hong-vu*, or *Tay-tſu*, reduced the fortreſs of Tong-quan; after which his troops entered Pecheli from Honan on the one ſide, and Shang-tong on the other. Here his generals defeated and killed one of Shun-ti's officers; after which they took the city of Tong-chew, and then prepared to attack the capital, from which they were now but 12 miles diſtant. On their approach, the emperor fled with all his family beyond the great wall, and thus put an end to the dynaſty of Ywen. In 1370 he died, and was ſucceeded by his ſon; whom the ſucceſſor of Hong-vu drove beyond the Kobi or Great Deſert, which ſeparates China from Tartary. They continued their incurſions, however, for many years; nor did they ceaſe their attempts till 1583, when vaſt numbers of them were cut off by the Chineſe troops.

(13.) **China, history of, to the present period.** The 21ſt dynaſty of Chineſe emperors, founded in 1368, by Chu, continued till 1644, when they were again expelled by the Tartars. The laſt Chineſe emperor was named Whey-tſong, who aſcended the throne in 1628. He was a great lover of the ſciences, and a favourer of the Chriſtians; though much addicted to the ſuperſtitions of the Bonzes. He found himſelf engaged in a war with the Tartars, and a number of rebels in different provinces. That he might more effectually ſuppreſs the latter, he reſolved to make peace with the former; and for that end ſent one of his generals, named *Ywen*, into Tartary, at the head of an army, with full power to negociate a peace; but that traitor made one upon ſuch ſhameful terms, that the emperor refuſed to ratify it. Ywen, to oblige his maſter to comply, poiſoned his beſt and moſt faithful general, named *Mau-ven-long*; and then deſired the Tartars to march directly to Peking, by a road different from that which he took with his army. This they accordingly did, and laid ſiege to the capital. Ywen was ordered to come to its relief: but on his arrival, was put to the torture and ſtrangled; of which the Tartars were no ſooner informed, than they raiſed the ſiege, and returned to their own country. In 1636, the rebels compoſed 4 great armies, commanded by as many generals; which, however, were ſoon reduced to two, commanded by Li and Chang. Theſe agreed to divide the empire between them; Chang taking the weſtern provinces, and Li the eaſtern ones. The latter ſeized on part of Shen-ſi, and then of Honan, whoſe capital, named Kay-fong-fu, he laid ſiege to, but was repulſed with loſs. He renewed it 6 months after, but without ſucceſs: the beſieged choosing rather to feed on human fleſh than ſurrender. The Imperial forces coming ſoon after to its aſſiſtance, the garriſon made no doubt of being able to deſtroy the rebels at once, by breaking down the banks of the Yellow River; but unfortunately the rebels eſcaped to the mountains, while the city was quite overflowed, and 300,000 of the inhabitants periſhed. After this, Li marched into the provinces of Shen-ſi and Honan; where he put to death all the mandarins, exacted great ſums from the officers, and ſhowed favour only to the populace, whom he freed from all taxes. He thus drew ſo many to his intereſt, that he thought himſelf ſtrong enough to aſſume the title of emperor. He next advanced towards the capital, which, though well garriſoned, was divided into factions. Li had taken care to introduce before-hand a number of his men in diſguiſe; by whom the gates were opened to him the 3d day after his arrival. He entered the city in triumph at the head of 300,000 men; whilſt the emperor kept himſelf ſhut up in his palace, buſied only with his ſuperſtitions. It was not long, however, before he found himſelf betrayed: Under the greateſt conſternation, he made an effort to get out of the palace, attended by about 600 of his guards. He was ſtill more ſurpriſed to ſee himſelf treacherouſly abandoned by them. Upon this, he immediately retired with his empreſs, whom he tenderly loved, and the princeſs her daughter, into a private part of the garden. His grief was ſo great that he was not able to utter a word; but ſhe ſoon underſtood his meaning, and, after a few ſilent embraces, hanged herſelf on a tree in a ſilken ſtring. Her huſband ſtaid only to write theſe words on the border of his veſt: "I have been baſely deſerted by my ſubjects; do what you will with me, but ſpare my people." He then cut off the young princeſs's head with one ſtroke of his ſcymitar, and hanged himſelf on another tree, in the 17th year of his reign, and 36th of his age. His prime miniſter, queens, and eunuchs, followed his example; and thus ended the Chineſe monarchy, to give place to that of the Tartars, which hath continued ever ſince. It was ſome time before the body of the unfortunate monarch was found. At laſt it was brought before the rebel Li, and by him uſed with the utmoſt indignity; after which he cauſed two of Whey-tſong's ſons, and all his miniſters to be beheaded; but his eldeſt ſon happily eſcaped by flight. The whole empire ſubmitted peaceably to the uſurper, except prince U-ſan-ghey, who commanded the imperial forces in the province of Lyau-tong. This brave prince finding himſelf unable to cope with the uſurper, invited the Tartars to his aſſiſtance, and Tſonge-te their king immediately joined him with an army of 80,000 men. Upon this the uſurper marched directly to Peking; but not thinking himſelf ſafe there, plundered and burnt the palace, and then fled with the immenſe treaſure he had got. The young Tartar monarch was immediately declared emperor of China, his father Tſong-te having died almoſt as ſoon as he ſet his foot in that empire. The new emperor, named SHUN-CHI, or XUN-CHI, began his reign with rewarding U-ſan-ghey, by conferring upon him the title of King; and aſſigned him the city of Si-gnan-fu, capital of Shen-ſi, for his reſidence. This, however, did not hinder U-ſan-ghey from repenting of his error in calling in the Tartars, or, as he himſelf uſed to phraſe it, "in ſending for lions to drive away dogs." In 1674, he formed a very ſtrong alliance againſt them, and had probably prevailed if his allies had been faithful; but they treacherouſly deſerted him one after another; which ſo affected him, that he died ſoon after. In 1681 Hong-wha, ſon to U-ſan-ghey, who continued his efforts againſt the Tartars, was reduced to ſuch ſtraits that he put an end to his own life. During this ſpace, there had been ſome reſiſtance made to the Tartars in many of the provinces. Two princes of Chineſe extraction had at different times been proclaimed emperors; but were overcome and put to death. In 1682, the whole 15 provinces were ſo effectually ſubdued, that the emperor Kang-hi, ſucceſſor to Shun-chi, determined to viſit his native dominions of Tartary. He was accompanied by an army of 70,000 men, and continued for ſome months taking the diverſion of hunting. He continued to make this viſit for ſeveral years; and in his journeys took father Verbeiſt along with him; from whom we have a better diſcription of theſe countries than could poſſibly have been otherwiſe obtained. This prince was a great encourager of learning and of the Chriſtian religion; in favour of which he publiſhed a decree, dated in 1692. In 1716, however, he revived ſome obſolete laws againſt the Chriſtians; nor could the Jeſuits with all their art preſerve the footing they had got in China. The cauſes of this alteration in his reſolution are, by the miſſionaries, ſaid to have been the ſlanders of the mandarins; but, from the known character of the Jeſuits, it will be readily believed, that there was ſomething more at bottom. This emperor died in 1722, and was ſucceeded by his ſon Yon-ching; who not only gave no encouragement to the miſſionaries, but perſecuted all Chriſtians of whatever denomination, not excepting even thoſe of the imperial race. At the beginning of his reign he baniſhed all the Jeſuits into the city of Canton; and in 1732 they were baniſhed from thence into Ma-kau, a little iſland inhabited by the Portugueſe, but ſubject to China. He died in 1736; but though the Jeſuits entertained great hopes from his ſucceſſor, we have not heard that they have yet met with any ſucceſs. The next memorable occurrence in the hiſtory of China, is the voluntary migration of a vaſt number of Ruſſian Tartars into China. In 1771, all the Tartars which compoſed the nation of the Tourgouths, left their ſettlements under the Ruſſian government on the banks of the Wolga, and the Iaick, near the Caſpian ſea, and, in a body of 50,000 families, they paſſed through the country of the Haſacks. After a march of 8 months, in which they ſurmounted innumerable difficulties and dangers, they arrived in the plains on the frontier of Carapan, near the river Ily, and offered themſelves as ſubjects to Kien-long, emperor of China, who was then in the 36th year of his reign. He received them graciouſly, furniſhed them with proviſions, clothes and money, and allotted to each family a portion of land for agriculture and paſturage. In 1772, there was a ſecond immigration of about 30,000 other Tartar ſamilies, who alſo quitted their ſettlements under the Ruſſian government, and ſubmitted to the Chineſe ſceptre. The emperor cauſed the hiſtory of theſe immigrations to be engraven on ſtone in 4 different languages. Having thus noticed the moſt remarkable events in the hiſtory of this great empire, it might be thought on omiſſion, if we ſilently paſſed over the ſplendid embaſſy ſent by the British government, in 1792, under Lord Macartney, to the emperor Kien Long, who was then in the 85th year of his age, and 57th of his reign. The embaſſy conſiſted of 44 perſons, beſides the Earl, and the ſecretary, Sir George Staunton; with a guard of 50 ſoldiers. In the ſuite were a phyſician and a philoſopher; a mechaniſt; a portrait painter; a draftſman, and a mathematical inſtrument maker; rather unuſual appendages of an embaſſy, but in this caſe both uſeful and neceſſary. The earl and his ſuite ſet ſail from Portſmouth, Sept. 25, 1792, in the Lion of 64 guns, commanded by Sir Eraſmus Gower, and accompanied by the Hindoſtan Eaſt Indiaman, and the Jackall brig: On the 17th Aug. they arrived at Pekin; where, after being detained 14 days, Lord Macartney learned that the emperor was then at Jehol in Tartary. He accordingly ſet off for that place on the 2d of Sept. leaving great part of his train at Pekin; and arrived at Jehol, on the 8th, where their reception was but indifferent. On the 12th a part of the preſents were ſent to the emperor, and on the 14th the earl had his firſt interview, and delivered his credentials, which were received with the moſt ceremonious formality: on the 15th and 17th he had his 2d and 3d audiences and on the 18th his audience of leave when the emperor refuſed to enter into any written treaty with his Britannic Majeſty; upon a fundamental principal in Chineſe politics, that innovation of whatever kind, is innevitably pregnant with ruin. He, however, expreſſed his high reſpect for the Britiſh nation; his inclination to grant them greater indulgences than any other European power, and to diminiſh the duties payable by them at Canton, provided it could be done without prejudice to his own ſubjects. He then delivered to the Earl, a box containing the miniature pictures of all his imperial predeceſſors, with verſes by each, deſcriptive of himſelf; which he ſaid, was "the moſt valuable preſent his empire could furniſh, as it had been tranſmitted through a long line of anceſtors, and was the laſt token of affection which he had reſerved for his own ſon." On the 21ſt Sept. Lord Macartney returned to Pekin: the emperor followed on the 28th, and the remaining preſents were ſoon after ſent to his palace. At laſt, on the 7th Oct. the gentlemen of the embaſſy were equally ſurpriſed and mortified by a ſudden and moſt unexpected order to depart in two days. Our ambaſſador and his ſuite accordingly left Pekin for Tong-tchew on the 9th October, and arrived at Spithead, Sept. 3, 1794. Thus the hopes, indulged by the Britiſh, of the great and manifold advantages to be derived from this embaſſy, were blaſted.

(14.) **China, houses, palaces, bridges, &c. in.** The Chineſe architecture is entirely different from that of the Greeks and Romans; but nevertheleſs has certain proportions of its own, and a beauty peculiar to itſelf. The emperor's palaces announce in a ſtriking manner the grandeur of the poſſeſſor. All the miſſionaries who had acceſs to the inſide of the emperor's palace at Peking, agreed, that if each of its parts, taken ſeparately, does not afford ſo much delight to the eye as ſome pieces of the grand architecture of Europe, the whole preſents a ſight ſuperior to any thing they had ever ſeen before. In the Chineſe architecture, when a pillar is two feet diameter at the baſe its height muſt be 14 feet; and by meaſures of this kind the height of every building is determined. Almoſt all the houſes and buildings in China are conſtructed of wood. One reaſon of this may be the dread of earthquakes; but, beſides this, ſuch buildings are rendered eligible by the heat and dampneſs of the ſouthern provinces, and the exceſſive cold in the northern, which would render ſtone houſes almoſt uninhabitable. Even at peking, where the rains are but of ſhort duration it is found neceſſary to cover the ſmall marble ſtair-caſes belonging to the imperial palace with pieces of felt: the humidity of the air moiſten and ſoaks into every thing. During winter the cold is ſo exceedingly ſevere, that no window can be opened to the north; and water continues conſtantly frozen to the depth of a foot and a half for more than 3 months. For the ſame reaſon a variety of ſtories are not uſed in the Chineſe buildings; as neither a 2d nor 3d ſtory would be habitable during the great heats of ſummer or the rigorous cold of winter. Though Peking is ſituated in the northern part of the empire, the heat there, during the dog-days, is ſo intolerably ſcorching, that the police obliges tradeſman and ſhopkeepers to ſleep in the upon air in the piazzas of their houſes, leſt they ſhould be ſtifled by retiring into their inner apartments. The habitations of people of rank, generally conſiſt of 5 large courts incloſed with buildings on every ſide. The method of building with ſeveral ſtories was, however, followed for ſeveral centuries, when the court reſided in the ſouthern provinces; and the taſte for this kind of building was carried to ſuch an height, that immenſe edifices were erected from 150 to 200 feet in height, and the pavilions or towers at the extremities roſe upwards of 300 feet. This kind of building, however, at length became diſguſting; though, either to preſerve the remembrance of it, or for the ſake of variety, there are ſtill ſome buildings to be ſeen ſeveral ſtories high in the palaces belonging to the emperor. A multiplicity of bridges are rendered neceſſary in China by the vaſt number of canals and rivers which interſect the empire. Anciently, however, the Chineſe bridges were much more ingenious as well as magnificent than they are at preſent. Some of them were ſo contrived that they could be erected in one day to ſupply the place of others which might happen to be broken down. At that time they had bridges reſembling the rainbow; draw-bridges, bridges to move with pullies, compaſs bridges, &c. with many others entirely unknown at preſent. Still, however, many of them are extremely beautiful and magnificent. The arches of ſome are very lofty and acute, with eaſy ſtairs on each ſide, the ſteps of which are not quite 3 inches in thickneſs, for the greater facility of aſcending and deſcending: others have no arches, but are compoſed of large ſtones, ſome 18 feet in length, placed tranſverſely upon piles like planks. Some of theſe bridges are conſtructed of ſtone, marble, or brick; others of wood; and ſome built upon a number of barges joined together by very ſtrong iron chains. Theſe are known by the name of *floating bridges*, and ſeveral of them are to be ſeen on the large rivers Kiang and Hoang-ho. They are built ſo as to be parted, to let the veſſels paſs that fall up and down the river. Some of them run from mountain to mountain, and conſiſt only of one arch; that over the river Saffrany is 400 cubits long, and 500 high, though a ſingle arch, and joins two mountains; and ſome in the interior parts of the empire are ſaid to be ſtill more ſtupendous. The triumphal arches of China form the next ſpecies of artificial curioſities. Though not built in the Greek or Roman ſtyle of architecture, yet they are very ſuperb and beautiful; being erected to the memory of their great men, with vaſt labour and expenſe. There are ſaid to be 1100 of them in all, of which 200 are particularly magnificent.

(15.) CHINA, INLAND NAVIGATION OF. The Chineſe have been at great pains to encourage their internal commerce, by promoting inland navigation. One of their principal works for this purpoſe, is the celebrated canal from Canton to Peking, which forms a communication between the ſouthern and northern provinces. It extends through no leſs a ſpace than 600 leagues; but its navigation is interrupted in one place by a mountain, where paſſengers are obliged to travel 10 or 12 leagues over land. A number of other canals are met with in this and other provinces. The commodiouſneſs and length of theſe are incredible. The chief of them are lined with hewn ſtone on the ſides, and they are ſo deep, that they carry large veſſels, and ſometimes they extend above 1000 miles in length. Theſe veſſels are fitted up for all the conveniences of life; and it has been ſuppoſed by ſome, that in China the water contains as many inhabitants as the land. The canals are furniſhed with ſtone quays, and ſometimes with bridges of an amazing conſtruction. The navigation is ſlow, and the veſſels ſometimes drawn by men. No precautions are wanting for the ſafety of the paſſengers, where a canal is croſſed by a rapid river, or expoſed to torrents from the mountains. Theſe canals, and the variety that is ſeen upon their borders, render China delightful in a very high degree, as well as fertile, in places not ſo by nature. M. Groſier remarks, that, in theſe works, the Chineſe have "ſurmounted obſtacles that perhaps would have diſcouraged any other people: ſuch, for example, is part of a canal which conducts from *Chao-king* to *Ning-po*." Near theſe cities there are two canals, the waters of which do not communicate, and which differ 10 or 12 feet in their level. To render this place paſſable for boats, the Chineſe have conſtructed a double glacis of large ſtones, or rather two inclined planes, which unite in an acute angle at their upper extremity, and extend on each ſide to the ſurface of the water. If the bark is in the lower canal, they puſh it up the plane of the firſt glacis by means of ſeveral capſtans, until it is raiſed to the angle, when by its own weight it glides down the ſecond glacis, and precipitates itſelf into the water of the higher canal with the velocity of an arrow.

(16.) CHINA, LAKES AND RIVERS OF. China has ſeveral large lakes; the principal one is Poyang-hou, in the province of Kiang-ſi. It is formed by the confluence of four large rivers, extends near 100 leagues in length; and, like the ſea, its waters are raiſed into tempeſtuous waves. Some places of the lake are ſaid to petrify fiſhes. The empire is watered by an immenſe number of rivers of different ſizes; ſuch as the YAMOUR and the ARGUN, which are boundaries between the Ruſſian and Chineſe Tartary; the CROCEUS or *Whang-ho*; the KIAM, or Blue River; the TAY, &c. There are two rivers particularly celebrated, viz. the YANG-TSE-KIANG, or the Son of the Sea; and HOANG-HO, or the yellow River. See theſe articles. The following remarkable phenomenon in a Chineſe river is related by Father Le Couteux, a French miſſionary. "Some leagues above the village Che-pai, (ſays he) the river becomes conſiderably ſmaller, although none of its waters flow into any other channel; and, 8 or 9 leagues below, it reſumes its former breadth, without receiving any additional ſupply, excepting what it gets from a few ſmall rivulets, which are almoſt dry during the greater part of the year. Oppoſite to Che-pai it is ſo much diminiſhed, that, excepting one channel, which is not very broad, I have paſſed and repaſſed it ſeveral times by the help of a common pole. I was always ſurpriſed to find this river ſo narrow and ſhallow in that place; but I never thought of inquiring into the cauſe of it, until the loſs of a bark belonging to a Chriſtian family afforded me an opportunity. In that place where the river diminiſhes almoſt of a ſudden, it flows with great impetuoſity; and where it reſumes its former breadth it is equally rapid. When I arrived at the place where this bark had been loſt, the weather was mild and ſerene; I perceived eddies in the current every where around; which abſorbed and carried to the bottom of the river whatever floated on the ſurface; and I obſerved, that the ſand was thrown violently up with a vortical motion. Above theſe eddies the water was rapid, but without any fall; and in the place below, where the river reſumes its uſual courſe, no eddies are to be ſeen, but the ſand is thrown up in the ſame violent manner: and in ſome places there are water-falls, and a kind of ſmall iſlands ſcattered at ſome diſtance from one another. Theſe iſlands which appear above the ſurface of the water, are not ſolid earth, but conſiſt of branches of trees, roots, and herbs collected together. I am of opinion, that, at the place of the river which is above Che-pai, the water falls into deep pits, from whence it forces up the ſand with that vortical motion; and that it flows under ground to the other place, 8 or 9 leagues below, where it carries with it all the boughs, weeds, and roots, which it waſhes down in its courſe, and thus forms thoſe iſlands which appear above its ſurface."

(17.) CHINA, MANDARINS OF. The mandarins are of two claſſes, viz. thoſe of letters, and thoſe of arms. The latter by no means enjoy the ſame conſideration with the former. In China the literati are highly honoured, and to their influence M. Groſier ſuppoſes that we may in a great meaſure aſcribe the mildneſs and equity of the government. Several degrees, anſwering to thoſe of bachelor, licentiate, and doctor, muſt be paſſed through, before one can attain to the dignity of a mandarin of letters; though ſometimes, by the favour of the emperor, it is conferred on thoſe who have attained only the two firſt degrees: but even the perſons who have gone through all the 3, enjoy at firſt only the government of a city of the 2d or 3d claſs. When ſeveral vacancies happen in the government of cities, the emperor invites to court a correſponding number of the literati, whoſe names are written down in a liſt. The names of the vacant governments are then put into a box, raiſed ſo high, that the candidates are able only to reach it with their hands; after which they draw in their turns, and each is appointed governor of the city whoſe name he has drawn. There are 8 orders of theſe mandarines in China. 1. The CALAO, from whom are choſen the miniſters of ſtate, the preſidents of the ſupreme courts, and all the ſuperior officers among the militia. The chief of this order preſides alſo in the emperor's council, and enjoys a great ſhare of his confidence. 2. The TE-HIOSE, or man of acknowledged ability, is a title beſtowed upon every mandarin of the 2d rank; and from theſe are ſelected the viceroys and preſidents of the ſupreme council in the different provinces. 3. The TCHONG-TCHUEO, or ſchool of mandarins, act as ſecretaries to the emperor. 4. Y-TCHUEN-TAO. Theſe keep in repair the harbours, royal lodging houſes, and barks, which belong to the emperor, unleſs particularly engaged in ſome other office by his order. 5. The PING-PI-TAO have the inſpection of the troops. 6. The TUN-TIEN-HAO have the care of the high-ways. 7. The HO-TAO ſuperintend the rivers. 3. The HAI-TAO inſpect the ſea-coaſts. Thus the whole adminiſtration of the Chineſe empire is intruſted to the mandarins of letters; and the homage paid by the common people to every mandarin in office, almoſt equals that paid to the emperor himſelf. This indeed flows from the nature of their patriarchal form of government; which teaches the people to conſider the emperor as the father of the whole empire; the governor of a province, as the father of that province; and the mandarin, as the father of the city which he governs. The mandarins of arms have no ſhare in the government of the ſtate. To attain to this dignity, however, it is alſo neceſſary to paſs through the degrees of bachelor, licentiate, and doctor of arms. The accompliſhments neceſſary for a mandarin of arms are, ſtrength of body, with ability and readineſs in performing the various military exerciſes, and comprehending the orders requiſite for the profeſſion of arms: an examination on theſe ſubjects muſt be undergone before the candidate can attain the wiſhed for dignity. The mandarins of arms have tribunals, the members of which are ſelected from among their chiefs; and among theſe they reckon princes, counts, and dukes; for all theſe dignities, or ſomething equivalent to them, are met with in China. The principal of theſe tribunals is held at Peking, and conſiſts of 5 claſſes. 1. The mandarins of the rear-guard, called *Heou-fou*. 2. Of the left wing, *Tſa-fou*. 3. Of the right wing, or *Yeou-fou*. 4. Of the advanced main-guard, or *Tchong-fou*. 5. Of the advanced guard, or *Tſien-fou*. Theſe 5 tribunals are ſubordinate to one named *Iong-tching-fou*; the preſident of which is one of the great lords, whoſe authority extends over all the military men in the empire. By his high dignity he could render himſelf formidable even to the emperor; but to prevent this, he has for his aſſeſſor a mandarin of letters, who enjoys the title and exerciſes the function of ſuperintendant of arms. He muſt alſo take the advice of two inſpectors named by the emperor; and when theſe 4 have agreed upon any meaſure, their reſolution muſt ſtill be ſubmitted to the reviſal of a higher court named *Ping-pou*, which is entirely of a civil nature. The chief of theſe mandarins is a general, whoſe powers are equivalent to thoſe of our commanders in chief; and below him are other mandarins who act as ſubordinate officers. Theſe two claſſes of mandarins compoſe the *nobility* of China; but their office is not hereditary; the emperor alone continues or confers it. They have the privilege of remonſtrating to the emperor, either as individuals, or in a body, upon any part of his conduct which appears contrary to the intereſts of the empire. Theſe remonſtrances are ſeldom ill received, though the ſovereign complies with them only when he thinks proper. The number of literary mandarins in China is computed at upwards of 14,000; and thoſe of arms at 18,000; the former, however, are conſidered as the principal body in the empire; and this preference is thought to damp the military ardour of the nation in general, and to be one cauſe of that weakneſs in war, for which the Chineſe are remarkable. The principal mandarins are ſometimes diſmiſſed from all their employments, while others are only removed ſome degrees lower. Thoſe who have been degraded ten ſteps, run a riſk of never being employed again. Theſe are kept in perpetual remembrance of their misfortune, by being obliged to mention it in every public order they iſſue forth in their inferior ſtation; thus, "I, ſuch a mandarin, degraded one, two, three, &c. ſteps, command and order," *&c.* Over theſe inferior mandarins the inſpector of the province has a very unlimited authority, and can, by his own power, deprive them of their employments for a great offence; nor does he conſult the court, excepting where the immediate puniſhment of the criminal is not neceſſary. Every one of the mandarins is obliged, once in 3 years, to give in writing an exact account of the faults he has committed in the execution of his office. If he belongs to any of the 4 firſt claſſes, this confeſſion is examined at court; but if it is made by any of the inferior ones, it muſt be laid before the provincial tribunal of the governor. Government, however, is not ſatisfied even with this confeſſion; inquiry is made into the truth of it, and the conduct of the mandarin is ſcrutinized with the utmoſt ſeverity, the informations being ſubjected to the tribunal of mandarins; where they are carefully examined, the merits and demerits of thoſe ſubjected to this political inquiſition carefully balanced, and their names afterwards divided into 3 claſſes. The firſt conſiſt of thoſe for whom rewards and preferment are intended; the 2d, of thoſe for whom gentle reproof only is neceſſary; and the 3d, of thoſe who are to be ſuſpended or removed from their offices. Of theſe laſt ſome are allowed to continue; but they receive no ſalary, and are not only deprived of all their emoluments, but even of their honours. If they have been guilty of oppreſſing the people, or occaſioning a ſcarcity among the lower ranks, they are criminally impeached. The family burying place of every Chineſe is accounted ſacred, but for certain crimes the burying place of a mandarin is raſed to the foundation. No kind of puniſhment, however, inflicted on a father, is ſuppoſed in the leaſt to affect the character of his ſon; on the contrary, by great and important ſervices, it is poſſible for him to wipe out theſe ſtains from the memory of his anceſtors. Every ſuperior mandarin is obliged to inform himſelf of the faults of his inferiors, and expoſe them; nay, he would be puniſhed for them himſelf if he did not.

(18.) China, manufactures of. The art of manufacturing ſilk, according to the beſt authorities, was communicated by the Chineſe to the Perſians, and from them to the Greeks. The art has been known in this empire from the remoteſt antiquity; and the breeding of ſilk-worms and making of ſilk was one of the employments even of the empreſſes in very early ages. The moſt beautiful ſilk in the whole empire is that of *Tche-king*, which is wrought in the manufactories of Nanking. From theſe are brought all the ſtuffs uſed by the emperor, and ſuch as he diſtributes in preſents to his nobility. A great number of excellent workmen are alſo drawn to the manufactories of Canton by the commerce with Europe and other parts of Aſia. Here are manufactured ribbons, ſtockings, and buttons. A pair of ſilk ſtockings here coſt little more than 6s. ſterling. The quantity of ſilk produced in China ſeems to be almoſt inexhauſtible; the internal conſumption alone being incredibly great, beſides that which is exported in the commerce with Europe and the reſt of Aſia. In this empire all who poſſeſs a moderate fortune wear ſilk clothes; none but the lower claſs of people wearing cotton ſtuffs, which are commonly dyed blue. The principal ſtuffs manufactured by them are plain and flowered gauzes, of which they make ſummer dreſſes, damaſks of all colours; ſtriped, and black ſatins; napped, flowered, ſtriped, clouded, and pinked taffeties, crapes, brocades, pluſh, different kinds of velvet, and a multitude of other ſtuffs unknown in Europe. They make particular uſe of two kinds; one named *touan-tſe*, a kind of ſatin much ſtronger, but which has leſs luſtre than that of Europe; the other a kind of taffety, of which they make drawers and linings. It is woven exceedingly cloſe, and is yet ſo pliable, that it may be rumpled and rubbed between the hands without any creaſe; and even when waſhed like cotton cloth, it loſes very little of its luſtre. They manufacture alſo a kind of gold brocades, but of ſuch a ſlight nature, that they cannot be worn in clothes: they are fabricated by wrapping fine ſlips of gilt paper round the threads of ſilk. Porcelain is another great branch of Chineſe manufacture, and employs a vaſt number of workmen. The fineſt is made in a village called King-te-ching, in the province of Kiang-ſi. Manufactories have alſo been erected in Fo-kien and Canton, but their produce is not eſteemed; and one which the emperor cauſed to be erected at Peking, miſcarried entirely. The Chineſe divide their porcelain into ſeveral claſſes, according to its different degrees of fineneſs and beauty. The whole of the firſt is reſerved for the uſe of the emperor, ſo that none of it ever comes into the hands of other perſons, unleſs it happen to be cracked or otherwiſe damaged in ſuch a manner as to be unworthy of being preſented to the ſovereign. Among that ſent to the emperor, however, there is ſome porcelain of an inferior quality, which he diſpoſes of in preſents. There is ſome doubt, therefore, whether any of the fineſt Chineſe porcelain was ever ſeen in Europe. The uſe of glaſs is very ancient in China, though it does not appear that great value was ever put upon this kind of ware, the art of manufacturing it having been frequently loſt and revived again. The ſame indifference with regard to glaſs is ſtill entertained by the preſent emperors; however, a glaſs-houſe is eſtabliſhed at Peking, where a number of vaſes, &c. are made; and theſe are ſo much the more difficult in the execution, as none of them are blown. This manufactory, as well as many others, is conſidered only as an appendage of the court, deſtined for the purpoſes of pomp and magnificence.

(19.) China, military force of. The armies of this empire are proportioned to its vaſt extent and population; according to the information given to the gentlemen of the Engliſh embaſſy by Van-ta-Zhin, a diſtinguiſhed officer, the total of the army in the pay of China, including Tartars, amounted to 1 million infantry, and 800,000 cavalry. From the obſervations of the embaſſy, in their travels through the empire, of the garriſons in the cities of different ranks, and of the military poſts at ſmall diſtances from each other, there ſeemed nothing improbable in the calculation of the infantry; but they obſerved few cavalry; and in crediting the exiſtence of ſuch a number it muſt be ſuppoſed that a great proportion of them were in Tartary, or on ſome ſervice diſtant from the route of the embaſſy. Their pay amounts to about 2½d and a meaſure of rice per day, though ſome of them have double pay. The pay of a horſeman is double that of a foot ſoldier; the emperor furniſhes a horſe, and the horſeman receives two meaſures of ſmall beans for his daily ſubſiſtence; the arrears of the army being punctually paid up every 3 months. The arms of a horſeman are, a helmet, cuiraſs, lance and ſabre; thoſe of a foot ſoldier are a pike and ſabre; ſome have fuſees, and others bows and arrows. All theſe are carefully inſpected at every review; and if any of them are found in the leaſt ruſted; or otherwiſe in bad condition, the poſſeſſor is inſtantly puniſhed; if a Chineſe, with 30 or 40 blows of a ſtick; or, if a Tartar, with as many laſhes. Though the uſe of gunpowder is certainly very ancient in China, it appears to have been afterwards totally loſt; at leaſt fire arms ſeem to have been almoſt entirely unknown ſome centuries ago. Three or four cannon were to be ſeen at that time about the gates of Nanking; but not a ſingle perſon in China knew how to make uſe of them; ſo that, in 1621, when the city of Macao made a preſent of 3 pieces of artillery to the emperor, it was found neceſſary alſo to ſend 3 men to load them. The utility of theſe weapons was quickly perceived by the execution which the 3 cannon did againſt the Tartars, at that time advanced as far as the great wall. When the invaders threatened to return, the mandarins of arms gave it as their opinion, that cannons were the beſt arms they could make uſe of againſt them. They were then taught the art of caſting cannon, by F. Adam Schaal and Verbieſt, two Jeſuit miſſionaries, and their artillery was increaſed to the number of 320 pieces; at the ſame time that they were inſtructed in the method of fortifying towns, and conſtructing fortreſſes and other buildings, according to the rules of modern architecture. There are in China more than 2000 places of arms; and through the different provinces there are diſperſed about 3000 towers or caſtles, all defended by garriſons. Soldiers continually mount guard there; and on the firſt appearance of tumult, the neareſt centinel makes a ſignal from the top of the tower, by hoiſting a flag in the day, or lighting a torch in the night; when the neighbouring garriſons immediately repair to the place where their preſence is neceſſary.

(20.) CHINA, MONEY OF. The only money anciently uſed in China was made of ſmall ſhells, but now both ſilver and copper coin are met with. The latter conſiſt of ſmall round pieces about 9 tenths of an inch in diameter, with a ſmall ſquare hole in the middle, inſcribed with two Chineſe words on one ſide, and two Tartar ones on the other. The ſilver pieces are valued only by their weight. For the convenience of commerce the metal is therefore caſt into plates of different ſizes; and for want of ſmall coin, a Chineſe always carries about him his ſcales, weights, and a pair of ſciſſars to cut the metal. In giving of change, ſilver is not valued by the numerical value of copper, this being entirely regulated by the intrinſic value of the metals. Thus, an ounce of ſilver will ſometimes be worth 1000 copper pieces, and ſometimes only 800; and thus the copper money of China may frequently be ſold for more than it would paſs for in commerce. The emperor would loſe much by this recoinage, were he not the ſole proprietor of all the copper mines in China. If the value of unwrought copper exceeds that of the coin, a quantity of the latter is fixed to reſtore the equilibrium. To keep up a conſtant circulation of all the coin in the empire, the Chineſe government are attentive to preſerve an equilibrium between the proportional value of the gold and ſilver; that is, to regulate the intrinſic value of each in ſuch a manner, that the poſſeſſor of ſilver may not be afraid to exchange it for copper, nor the poſſeſſor of copper for ſilver.

(21.) CHINA, PECUNIARY INSTITUTIONS IN. In all the Chineſe cities, and even in ſome of their ordinary towns, there is an office where money may be borrowed upon pledges. Every pledge is marked with a number when left at the office, and muſt be produced when demanded; but it becomes the property of the office, if left there a ſingle day longer than the term agreed on for re-payment. The whole tranſaction remains an inviolable ſecret; not even the name of the perſon who leaves the pledge being inquired after. Lending money upon intereſt has been in uſe in China for about 2000 years. It has often been aboliſhed, and as often eſtabliſhed. The intereſt is no leſs than 30 per cent. and the year is only lunar. A tenth part of this intereſt is paid monthly; and concerning neglects of payment, the following laws have been enacted. "However much the debt may have accumulated by months or years, the principal and intereſt ſhall remain always the ſame. Whoever infringes this law ſhall receive 40 blows of a *pan-tſee;* or 100 if he uſes any artifice to add the principal and intereſt together." This law is explained by the following. "Whoever ſhall be convicted before a mandarin of not having paid a month's intereſt, ſhall receive 10 blows; 20 for two months; and 30 for three; and in this manner as far as ſixty; that is to ſay, to the ſixth month. The debtor is then obliged to pay the principal and intereſt; but thoſe who obtain payment by uſing violence are condemned to receive 24 blows.

(22.) CHINA, PENAL AND CRIMINAL LAWS OF. In China, adultery with a married woman, and ſeduction of a virgin are capital crimes. Though the Chineſe laws authoriſe ſlavery, yet the power of the maſter extends only to matters which concern his own ſervice; and he would be puniſhed with death, were he to take advantage of his power to debauch the wife of his ſlave. Authors who write againſt government, are alſo ſubjected to capital puniſhment. In criminal matters every perſon accuſed muſt be examined before 5 or 6 tribunals; whoſe enquiries are directed not only againſt him, but againſt his accuſer, and the witneſſes that appear in the cauſe. He is however, obliged to remain in priſon during the proceſs: "but (ſays M. Groſier) the Chineſe priſons are not horrible dungeons, like thoſe of ſo many other nations: they are ſpacious, and have even a degree of convenience. One of the mandarins is obliged to inſpect them frequently; and this he does with the greater punctuality, as he muſt anſwer for thoſe who are ſick. He is obliged to ſee them properly treated, to ſend for phyſicians, and to ſupply them with medicines at the emperor's expenſe. If any of them dies, he muſt inform the emperor, who perhaps will order ſome of the higher mandarins to examine whether the former has diſcharged his duty faithfully. The accuſed are always treated with lenity, being accounted innocent until their guilt be clearly proved; and even then, liberty excepted, they are ſcarce allowed to want any thing. A jailor is puniſhed who behaves rigorouſly towards his priſoners; and the judges muſt likewiſe anſwer at their peril for any additions to the ſeverity of the law; depoſition being the ſlighteſt puniſhment inflicted upon them. Subſtitution is ſometimes allowed by the laws of China; ſo that the near relation of a guilty perſon may put himſelf in the criminal's place, provided, however, that the chaſtiſement be ſlight, and the accuſed his ancient friend. The wife, brothers, ſons, and grand-ſons, of a baniſhed Chineſe, are allowed to follow him into exile; and the relations of all perſons are permitted to viſit them in priſon, and to give them every aſſiſtance in their power; to do which good offices they are even encouraged, inſtead of being prevented. The Chineſe, in their criminal procedure, have a great advantage over moſt other nations: it is almoſt impoſſible that an innocent man ſhould ever become a victim to falſe accuſation: in ſuch caſes the accuſer and witneſſes are expoſed to too much danger. The ſlowneſs of the proceſs, and the numberleſs reviſions it undergoes, are another ſafe-guard for the accuſed. A fair copy of the whole proceſs is laid before the emperor; a number of other copies are alſo made out, both in the Chineſe and Tartar languages, which the emperor ſubmits to the examination of a like number of doctors, either Tartars or Chineſe. When the crime is of great enormity, and clearly proved, the emperor writes with his own hand at the bottom of the ſentence, "When you receive this order, let it be executed without delay." In caſes where the crime, though puniſhable by death according to law, is ranked only in the ordinary claſs, the emperor writes at the bottom of the ſentence, "Let the criminal be detained in priſon, and executed in autumn;" that being the ſeaſon in which they are generally executed, and all on the ſame day. The emperor never ſigns an order for execution, till he has prepared himſelf by faſting. He has the power of giving pardons, but in this reſpect is much more limited than other monarchs. The only caſes in which he can remit the puniſhment appointed by law are, 1. To the ſon of a widow who has not married again; 2. To the deſcendents of great men or citizens who have deſerved well of their country; and, 3. To the ſons or grandſons of a mandarin, who has become illuſtrious, and diſtinguiſhed himſelf by faithfully diſcharging the duties of his office. Neither a child, nor a man of very advanced age, can be cited before a tribunal. The ſon of a very aged father and mother is pardoned, if private property, or the public peace be not hurt by giving him a pardon; and if the ſons of ſuch a father and mother be all guilty, or accomplices in the ſame crime, the youngeſt is pardoned in order to comfort his parents.

(23.) **China, police of.** Every city in China is divided into different quarters, each of which is ſubjected to the inſpection of a certain officer, who is anſwerable for whatever paſſes in the places under his juriſdiction. Fathers of families are anſwerable for the conduct of their children and domeſtics. Neighbours are even obliged to anſwer for one another, and are bound to give every help and aſſiſtance in caſes of robbery, fire, or any accident, eſpecially in the night. All the cities are furniſhed with gates, which are barricaded on the recommencement of night. Centinels are alſo poſted at certain diſtances throughout the ſtreets, who ſtop all who walk in the night, and a number of horſemen go round the ramparts for the ſame purpoſe; ſo that it is almoſt impoſſible to elude their vigilance. A ſtrict watch is alſo kept during the day; and all who give cauſe of ſuſpicion by their looks or behaviour, are carried before a mandarin, and ſometimes detained until the governor be conſulted. Private quarrels do not often happen in China, and it is rare that they are attended with a fatal iſſue. The champions ſometimes decide the quarrel with their fiſts, but moſt frequently refer the cauſe to a mandarin, who often orders both a ſound drubbing. None but military people are permitted to wear arms in public; and this privilege is extended even to them only during war, or when they accompany a mandarin, mount guard, or attend a review. Proſtitutes are not allowed to remain within a city, or keep a houſe of their own even in the ſuburbs. They may, however, lodge in the houſe of another; but that other is accountable for every diſturbance, which may happen on their account.

(24, 25.) **China, population and provinces of.** The population of China is ſo great, in compariſon with that of the European countries, that the accounts of it have generally been treated as fabulous; but by an accurate inveſtigation of ſome Chineſe records, concerning the number of perſons liable to taxation throughout the empire, M. Groſier ſhows, that it cannot be leſs than 200 millions. For this extraordinary population he aſſigns the following cauſes. 1. The ſtrict obſervance of filial duty throughout the empire, and the prerogatives of fraternity, which make a ſon the moſt valuable property of a father. 2. The infamy attached to the memory of thoſe who die without children. 3. The univerſal cuſtom, by which the marriage of children becomes the principal concern of the parents. 4. The honours beſtowed by the ſtate on thoſe widows who marry a ſecond time. 5. Frequent adoptions, which prevent families from becoming extinct. 6. The return of wealth to its original ſtock by the diſinheriting of daughters. 7. The retirement of wives, which renders them more complaiſant to their huſbands, ſaves them from a number of accidents when big with child, and conſtrains them to employ themſelves in the care of their children. 8. The marriage of ſoldiers. 9. The fixed ſtate of taxes; which being always laid upon lands, never fall but indirectly on the trader and mechanic. 10. The ſmall number of ſailors and travellers. 11. To theſe may be added the great number of people who reſide in China only by intervals; the profound peace which the empire enjoys; the frugal and laborious manner in which the great live; the little regard that is paid to the vain and ridiculous prejudice that is paid of marrying below one's rank; the ancient policy of giving diſtinction to men and not to families; by attaching nobility only to employments and talents, without ſuffering it to become hereditary. And, 12. laſtly, A decency of public manners, and a total ignorance of ſcandalous intrigues and gallantry.—To ſome, even this account of the population of China, with all the cauſes here aſſigned for it, may ſeem incredible, yet it is far below the amount of the following ſtatement delivered to Lord Macartney, at his requeſt, by Chow-ta-Zhin, a Chineſe mandarin, as taken from authentic documents in one of the public offices in Pekin. It ſhows not only the population of each province, but the extent in ſquare miles.

Pro-

Provinces.	*Population.*	*Sq. Miles.*
Pe-che-lee,	38,000,000	58,949
Kian-nan, 2 provinces,	32,000,000	92,961
Kiang-ſee,	19,000,000	72,176
Tche-kiang,	21,000,000	39,150
Eo-chen,	15,000,000	53,480
Hou-pe, Hou-	14,000,000	144,770
Hou-nan, quang,	13,000,000	
Ho-nan,	25,000,000	65,104
Shang-tung,	24,000,000	65,104
Shan-ſee,	27,000,000	55,268
Shen-ſee,	18,000,000	154,008
Kan-ſore,	12,000,000	
Se-chuen,	27,000,000	166,800
Canton,	21,000,000	79,456
Quang-ſee,	10,000,000	78,250
Yu-nan,	8,000,000	107,969
Koei-cheou,	9,000,000	64,554
Total	333,000,000	1,207,999

For this ſtatement, Sir G. Staunton, in his account of the embaſſy to China, ſpeaks thus: "The extent of the provinces is aſcertained by aſtronomical obſervations, as well as by admeaſurement. The number of individuals is regularly taken in each diviſion of a diſtrict, by a tything man, or every tenth maſter of a family. Theſe returns are collected by officers reſident ſo near as to be capable of correcting any groſs miſtake; and all the returns are lodged in the regiſter at Pekin." He, however, acknowledges the immenſity of the amount of the population; to account for which, among other cauſes not differing much from thoſe before mentioned, he notices the general application of the Chineſe to the healthful employment of agriculture. "In general, (ſays he) there ſeems to be no other bounds to Chineſe populouſneſs than thoſe which the neceſſity of ſubſiſtence may put to it. Theſe boundaries are certainly more enlarged than in other countries. The whole ſurface of the empire is, with trifling exceptions, dedicated to the production of food for man alone."

(26.) **CHINA, PRIVILEGES OF PRINCES IN.** Very little regard is paid to hereditary right in China. Even the princes of the blood enjoy no other privileges by birth, but that of wearing a yellow girdle; and the names of their children, with the exact time of their birth, are inſcribed in a yellow book appropriated to that purpoſe. Collateral princes are diſtinguiſhed by an orange girdle, and their children are marked in a book of a red colour. The ſurnames of the princes of the reigning family are determined by the emperor. The rank even of the emperor's ſons diminiſhes one degree every generation; ſo that, at the 7th, only the eldeſt branch has a title to wear the yellow girdle, the reſt being ſunk into the rank of plain citizens. An hereditary ſovereignty, however, paſſes from one eldeſt ſon to another; and this title cannot be forfeited, unleſs the poſſeſſor be guilty of ſome crime. In this caſe, the emperor appoints to the ſucceſſion either one of his younger brothers or a couſin; but theſe muſt be always choſen from the ſame branch, as the lawful branch cannot be deprived of its right without the condemnation of all who compoſe it. The only hereditary authority of the other princes exiſts among thoſe troops called the *Tartar bands*. In every thing elſe they are on a level with others. They are ſubjected to a military examination at ſtated periods, and are promoted or degraded according to the degree of ſkill they exhibit. The ſame trial is undergone by the heir apparent and his ſons; the only indulgence ſhown them being, that ſchools are appointed for their particular uſe. The princes are likewiſe indulged with a tribunal, before which alone they can be tried. An inſult offered to a prince decorated with the yellow girdle is puniſhed with death; but if he has omitted to put it on, the aggreſſor eſcapes with a baſtinading. A prince may be put to death by the emperor's conſent; but he eſcapes every ſlighter corporal puniſhment by paying a fine. Untitled princes have very few privileges ſuperior to thoſe of common citizens; and are generally very poor, unleſs poſſeſſed of ſome lucrative office. They are ſometimes under the neceſſity of accepting the higheſt pay of a common ſoldier in the Tartar bands. When they, or any of their children, however, enter into the marriage ſtate, the emperor uſually makes them a preſent of 100 ounces of ſilver. He alſo relieves them on other occaſions, aſſiſts their widows and orphans, &c. but in all this never departs from the moſt exact rules of economy; ſo that the mandarins in this reſpect are much better than the relations of the ſovereign himſelf.

(27.) **CHINA, PUBLIC CENSORS OF.** To prevent any unlawful combination among the tribunals, (§ 5.) each has its *cenſor* appointed. This is an officer whoſe duty is merely to watch over the proceedings of the court, without deciding upon any thing himſelf. He aſſiſts therefore at all aſſemblies, reviſes all their acts, and without acquainting the court in the leaſt with either his ſentiments or intentions, immediately informs the emperor of what he judges to be amiſs. He likewiſe gives information of the behaviour of the mandarins, either in the public adminiſtration of affairs, or in their private conduct; nay, ſometimes, he will not ſcruple to reprimand the emperor for what he ſuppoſes to be erroneous in his conduct. Theſe cenſors are never removed from their places but when promoted; and thus, holding their offices for life, they have the greater courage to ſpeak out, when they oberve any impropriety or abuſe. Their accuſation is ſufficient to ſet on foot an inquiry, which generally leads to a proof; in which caſe the accuſed is diſcharged from his office, and never held in any eſtimation afterwards. The complaints of the cenſors, however, are referred to the very tribunals againſt whoſe members they complain; though, being afraid of an accuſation themſelves, they very ſeldom paſs ſentence againſt the accuſers. Beſides all this, the cenſors alſo form a tribunal of their own, named *Tou-tche-yven*. Its members have a right of remonſtrating with the emperor, whenever his own intereſt or that of the public renders it neceſſary. They inſpect all lawyers and military men in public employments. "In ſhort (ſays M. Groſier,) they are morally ſpeaking, placed between the prince and the mandarins; between the mandarins and the people; between the people and families; between families and individuals; and they generally unite to the importance of their office incorruptible probity and invincible courage. The ſovereign may, if he proceeds to rigour take away their lives; but many of them have patiently ſuffered death, rather than betray the cauſe of truth, or wink at abuſes. It is not ſufficient therefore to have got rid of one, they muſt be all treated in the ſame manner; the laſt that might be ſpared would tread in the ſame ſteps with no leſs reſolution than thoſe who went before him. In the annals of no nation do we find an example of ſuch a tribunal, yet it appears to be neceſſary in all without exception."

(28.) CHINA, PUBLIC FESTIVALS IN. There are ſeveral public feſtivals annually celebrated in China. The feſtival of Agriculture, (ſee § 32.) is celebrated throughout the whole empire. In the morning the governor of every city comes forth from his palace crowned with flowers, and enters his chair amidſt the noiſe of different inſtruments. The chair is ſurrounded by litters covered with ſilk carpets, on which are repreſented either ſome illuſtrious perſons who have encouraged agriculture, or ſome hiſtorical painting on the ſame ſubject. The ſtreets are hung with carpets; triumphal arches are erected at certain diſtances; lanthorns every where diſplayed, and all the houſes illuminated. During the ceremony a figure reſembling a cow, made of baked earth, with gilt horns, is carried in proceſſion. It is of ſuch enormous magnitude that 40 men are ſcarce able to ſupport it. A child follows with one foot naked and the other ſhod, who is called the *ſpirit of labour and diligence*, and keeps continually beating the image with a rod to make it advance. Labourers, with their implements of huſbandry, march behind; and the proceſſion is cloſed by comedians and people in maſks. The governor advances towards the E. gate, and returns in the ſame manner. The cow is then ſtripped of its ornaments, and a prodigious number of earthen calves taken from its belly and diſtributed among the people; after which the cow is broken in pieces and diſtributed in the ſame manner. The ceremony ends with an oration in praiſe of agriculture, in which the governor endeavours to excite his hearers to the practice of that uſeful art. Other two feſtivals are celebrated in China with ſtill more magnificence. One of them is at the commencement of the year; the other is called the *feaſt of lanthorns*. During the celebration of the former, all buſineſs is ſuſpended; the tribunals are ſhut; the poſts ſtopped, preſents are given and received, and viſits paid. Every family aſſembles in the evening, and partakes of a feaſt to which no ſtranger is admitted; though they become a little more ſociable next day. The feaſt of lanthorns ought to take place on the 15th day of the firſt month, but uſually commences on the evening of the 13th day, and does not end till that of the 16th. At that time, every city and village, the ſhores of the ſea, and the banks of all the rivers, are hung with lanthorns of various ſhapes and ſizes; ſome of them being ſeen in the windows of the pooreſt houſes. No expence is ſpared on this occaſion. The rich often lay out 8l. or 9l. ſterling on one lanthorn. Some of theſe are very large, compoſed of 6 wooden frames neatly painted or gilt, and filled up with pieces of fine tranſparent ſilk, upon which are painted flowers, animals, and human figures; others are blue, and made of a tranſparent kind of horn. Several lamps, and a great number of wax candles, are fixed in the inſide: to the corners of which are placed ſtreamers of ſilk and ſatin of different colours, with a curious piece of carved work on the top. The Chineſe, being acquainted with our magic lanthorns, ſometimes introduce them in this feſtival. They have alſo the art of forming ſnakes 60 or 80 feet long, filled with lights from one end to the other; which they cauſe twiſt themſelves into different forms, and move about as if they were real ſerpents. During this feſtival all the varieties of the Chineſe fire-works, ſo juſtly admired, are exhibited. In ſhort every public ceremony in China is carefully rendered as ſtriking as poſſible. The magnificence of the public proceſſions of their emperors and viceroys is carried to the utmoſt pitch; and the homage paid to them on ſuch occaſions, approaches almoſt to adoration.

(29.) CHINA, PUBLIC INSPECTORS OF. The inſpectors are officers appointed to examine into the conduct of governors, magiſtrates, and private individuals; and inſtances are recorded of emperors themſelves aſſuming the office of inſpectors in ſome of the provinces. Theſe officers are not only ſuperior to all the magiſtrates, but even to the viceroys of the provinces themſelves. When a ſuperior magiſtrate behaves ill to an inferior one, the former inſtantly becomes the priſoner of the inſpector, and is ſuſpended from his office until he has cleared himſelf from every imputation laid to his charge. The viceroy, however, is allowed to enjoy his office, until the report of the inſpector has been tranſmitted to the emperor.

(30.) CHINA, PUNISHMENTS IN. The slighteſt puniſhment in China is the baſtinado; and the number of blows is determined by the degree of the offender's guilt. The loweſt number is 20, which is conſidered as having nothing infamous in it, but only a ſimple paternal correction. In this way the emperor ſometimes orders it to be inflicted on his courtiers; which does not prevent them from being afterwards received into favour, and as much reſpected as before. Every mandarin may inflict the baſtinado when any one forgets to ſalute him, or when he ſits in judgment in public. The inſtrument of correction, is called PAN-TSEE, and is a piece of bamboo a little flatted, broad at the bottom, and poliſhed at the upper extremity, to manage it more eaſily with the hand. When the puniſhment is to be inflicted, the magiſtrate ſits gravely behind a table, having on it a bag filled with ſmall ſticks, while a number of petty officers ſtand around him, furniſhed with pan-tſees, and waiting for his ſignal to uſe them. The mandarin then takes out one of the little ſticks contained in the bag, and throws it into the hall of audience. On this the culprit is ſeized and ſtretched out with his belly towards the ground; his breeches are pulled down to his heels, and an athletic domeſtic applies 5 ſmart blows with his pan-tſee. If the judge draws another ſmall ſtick from the bag, another officer ſucceeds, and beſtows 5 more blows; and ſo on until the judge makes no more ſignals. When the puniſhment is over, the criminal muſt throw himſelf on his knees, bow 3 times to the earth, and thank the judge for the care he takes of his education. For greater faults, the carrying of a wooden collar, called by the Portugueſe the *cangue*, is inflicted. This machine is compoſed of two pieces of wood hollowed out in the middle, which, when put together, leave ſufficient room for the neck. Theſe are laid upon the ſhoulders of the criminal, and joined together in ſuch a manner, that he can neither ſee his feet nor put his hands to his mouth; ſo that he is incapable of eating without the aſſiſtance of another. This diſagreeable burden he is obliged to carry day and night; its weight is from 50 to 200 pounds, according to the enormity of the crime, to which the time of carrying it is alſo proportioned. For robbery, breaking the peace, diſturbing a family, or being a notorious gambler, it is generally carried three months. During all this time the criminal is not allowed to take ſhelter in his own houſe, but is ſtationed either in ſome public ſquare, the gate of a city or temple, or perhaps even of the tribunal where he was condemned. On the expiration of his term of puniſhment, he is again brought before the judge, who exhorts him in a freindly manner to amend; and after giving him 20 ſound blows, diſcharges him. Baniſhment is inflicted for crimes of a nature inferior to homicide, and the duration is often for life, if the criminals be ſent into Tartary. Some are condemned to drag the royal barks for three years, or to be branded in the cheeks with a hot iron, indicating the nature of their tranſgreſſions. Robbery between relations is more ſeverely puniſhed than any other; and that is accounted the moſt atrocious where younger brothers or nephews appropriate to themſelves beforehand any part of their ſucceſſion, in which they have a right to ſhare with their elder brothers or uncles. Information againſt a father or mother, grandfather or grandmother, uncle or eldeſt brother, even though the accuſation be juſt, is puniſhed with 180 blows of the pan-tſee, and 3 years baniſhment. If the accuſation be falſe, it is puniſhed with death. Deficiency in filial reſpect to a father, mother, grandfather, or grandmother, is puniſhed with 100 blows of the pan-tſee; abuſive language to theſe relations is death by ſtrangling; to ſtrike them is puniſhed by beheading; and if any one preſumes to hurt or maim them, his fleſh is torn from his bones with red hot pincers, and he is cut into 1000 pieces. Abuſing an elder brother is puniſhed with 100 blows of the pan-tſee; ſtriking him, with the puniſhment of exile. Homicide, even though accidental, is puniſhed with death in China. A rope about 6 or 7 feet long, with a running nooſe, is thrown over the criminal's head; and a couple of domeſtics, belonging to the tribunal, pull it ſtrongly in different directions. They then ſuddenly quit it, and in a few moments give a ſecond pull; a third is ſeldom neceſſary to finiſh the buſineſs. Beheading in China is accounted the moſt diſhonourable of all puniſhments, and is reſerved only for deſperate aſſaſſins, or thoſe who commit ſome crime equally atrocious with murder. To be cut in 1000 pieces is a puniſhment inflicted only upon ſtate criminals or rebellious ſubjects. It is performed by tying the criminal to a poſt, ſcalping the ſkin from the head, and pulling it over the eyes; then tearing the fleſh from different parts of the unhappy wretch's body. The executioner never quits this horrible employment, till mere fatigue obliges him to give over: the remains of the body are then left to the barbarous ſpectators, who finiſh what he has begun. Though this puniſhment has been inflicted by ſome emperors with all theſe dreadful circumſtances, the law only orders the criminal's belly to be opened, his body to be cut into ſeveral pieces, and then thrown into a ditch. The torture, both ordinary and extraordinary, is uſed in China. The former is applied to the hands or feet: for the hands, ſmall pieces of wood are applied diagonally between the fingers of the criminal; his fingers are then tied cloſe with cords, and he is left ſome time in that painful ſituation. The torture for the feet is ſtill worſe. An inſtrument, conſiſting of three croſs pieces of wood, is provided; that in the middle being fixed, the others moveable; the feet of the criminal are then put into this machine, which ſqueezes them ſo cloſe that the ancle bones become flat. The extraordinary torture conſiſts in making ſmall gaſhes in the body, and then tearing off the ſkin like thongs. It is never applied but for ſome great crime, ſuch as treaſon, or where the criminal's guilt has been clearly proved, and it is neceſſary to make him diſcover his accomplices.

(31.) **CHINA, RARE TREES IN.** All the rare trees, and aromatic productions, that abound in other parts of the world, are to be found in China, and ſome are peculiar to it. The TALLOW TREE has a ſhort trunk, a ſmooth bark, crooked branches, red leaves ſhaped like a heart, and is about the height of a common cherry tree. The fruit is a white berry, of the ſize of a hazel nut, which has all the qualities of tallow, and, when manufactured with oil, ſerves the natives as candles; but they ſmell ſtrong, nor is their light clear. Of the other trees peculiar to China, ſome yield a kind of flour; and ſome partake of the nature of pepper. The gum of one ſpecies is poiſonous, but affords the fineſt varniſh in the world. There is alſo a tree that produces peas, very little different from thoſe of the European plant: and another, called the *white wax tree*, which produces that article ſuperior even to bees wax. The tea plant may alſo be enumerated among the peculiar productions of China; as it grows no where elſe, except in Tonquin and Japan. See TEA.

(32.) **CHINA, RESPECT PAID TO AGRICULTURE IN.** Agriculture is by the Chineſe conſidered as the firſt and moſt honourable of all profeſſions. The huſbandman enjoys many and great privileges, while the merchant and mechanic are much leſs eſteemed. From the time he begins to till the earth, to the beginning of harveſt, he is free from all taxes. Agriculture is not only encouraged by law, but alſo by the example of the emperor, who annually tills the earth with his own hands. The beginning of ſpring in China is always reckoned to be in the month of February; but it belongs to the tribunal of mathematics to determine the preciſe day. The tribunal of ceremonies announces it to the emperor by a memorial; in which every thing requiſite to be done by him is mentioned with the moſt ſcrupulous exactneſs. The ſovereign then names 12 of the moſt illuſtrious perſons in his court to accompany him, and to hold the plow after he has performed his part of the ceremony. Among theſe there are always 3 princes of the blood, and 9 preſidents of ſupreme courts. The feſtival is preceded by a ſacrifice, which the emperor offers up to CHANG-TI (the ſupreme God); after which he and his attendants prepare themſelves by 3 days faſting and continence. Others are appointed by the emperor, on the evening before the ceremony, to proſtrate themſelves at the ſepulchre of his anceſtors, and to acquaint them, that, on the day follwing, he intends to celebrate a grand ſacrifice. This is offered up on a ſmall mount a few furlongs from the city, which, by the indiſpenſable rules of the ceremony, muſt be 50 feet in height. Chang-ti is invoked by the emperor, who ſacrifices under the title of ſovereign pontiff, and prays for an abundant harveſt to his people. He then deſcends, accompanied by the 3 princes and 9 preſidents, who are to put their hands to the plough along with him; the field ſet apart for this purpoſe being at a ſmall diſtance from the mount: 40 labourers are ſelected to yoke the oxen, and to prepare the ſeeds which the emperor is to ſow; and which are of 5 different kinds, viz. wheat, rice, two kinds of millet, and beans. They are brought to the ſpot in magnificent boxes, carried by perſons of the moſt diſtinguiſhed rank. The emperor then lays hold of the plough, and turns up ſeveral furrows; the princes of the blood do the ſame, and then the preſidents; after which the emperor throws into the furrows the 5 kinds of ſeeds; laſtly, 4 pieces of cotton cloth, proper for making dreſſes, are diſtributed to each of the labourers, who aſſiſt in yoking the oxen and preparing the ſeeds; and the ſame preſents are made to 40 other perſons who have only been ſpectators. See CHINESE, § 11.

(33.) CHINA, REVENUE. According to accounts received by Sir G. Staunton, the public revenues of China amount to nearly 200,000,000 ounces of ſilver, which may be equal to about L 66,000,000 ſterling. From the produce of the taxes, all civil and military expences are firſt paid upon the ſpot, out of the treaſuries of the reſpective provinces where ſuch expences are incurred; and the remainder is remitted to the imperial treaſury at Pekin. This ſurplus amounted, in the year 1792, according to an account taken from a ſtatement furniſhed by Chow-tá-zhin, to the ſum of 36,614,328 ounces of ſilver, or 12,204,776 l. The annual expenſes of goverment are indeed immenſe, but they are regulated in ſuch a manner as never to be augmented, but in caſes of the utmoſt neceſſity; it even happens very often that adminſtration makes great ſavings. The ſurplus, in ſuch caſes, increaſes the general treaſure of the empire, and prevents the neceſſity of new impoſitions in time of war, or other public calamities. The greater part of the taxes are paid in kind; thoſe, for inſtance, who breed ſilk worms, pay their taxes in ſilk, the huſbandmen in grain, the gardeners in fruits, &c. And thus the ſervants of government [illegible] are furniſhed with food and clothing; the remainder only being ſold, and the produce ſent to the emperor. The taxes paid in money ariſe principally from the cuſtoms, and ſale of ſalt, (which belongs entirely to the emperor,) from the duties paid by veſſels entering any port, and from impoſts on various manufactures. The taxes upon the huſbandman are regulated in proportion to the extent and fertility of his lands; and the greateſt care has been taken to manage matters ſo, that he may neither be overcharged in the impoſition nor haraſſed in the levying of the duties. The levying of taxes in China is as ſimple as the nature of the thing will admit of. The duties levied from towns and villages are carried to cities of the third claſs; then conducted to thoſe of the ſecond; then to thoſe of the firſt; and at laſt to the capital. A proper ſtatement of what is paid in the provinces of what is reſerved in the different cities, or contained in the different treaſuries of the empire, is ſubjected to the examination of the grand tribunal of finances. This reviſes the whole, and keeps an exact account of what is conſumed, and of whatever ſurplus may be left.

(34.) CHINA, ROADS, INNS, POSTS, &C. OF. Great attention is paid by the Chineſe government to the conveniency of travellers. The roads are generally very broad, all of them paved in the ſouthern provinces, and ſome in the northern; but neither horſes nor carriages are allowed to paſs along theſe. In many places valleys have been filled up, and rocks and mountains cut through, to make commodious high ways, and to preſerve them as nearly as poſſible on a regular level. They are bordered with very lofty trees, and in ſome places with walls 8 or 10 feet high; but openings are left, which give a paſſage into croſs roads, that lead to different villages. Covered ſeats are erected on all the great roads, where travellers may take ſhelter; temples and pagods are alſo frequent, into which travellers are admitted without ſcruple in the day, but they often meet with a refuſal in the night. In theſe the mandarins only have a right to reſt as long as they think proper. There is, however, no want of inns on the great roads, or even the croſs ones in China; but they are ill ſupplied with proviſions; and thoſe who frequent them are even obliged to carry beds along with them, or to put up with a plain mat. Towers are erected on all the roads, with watch boxes on the top, and flag ſtaffs, for ſignals in caſe of any alarm. Theſe towers are ſquare, and generally conſtructed of brick, but ſeldom exceed 12 feet in height. They are built, however, in ſight of one another, and are guarded by ſoldiers, who run with great ſpeed from one to another, carrying letters which concern the emperor. Intelligence of any remarkable event is alſo conveyed by ſignals; and thus the court, is informed with ſurpriſing quickneſs of any important matter. Thoſe, which are built on any of the roads conducting to court, are furniſhed with battlements, and have alſo very large bells of caſt iron. According to law theſe towers ſhould be only 5 *lys*, about half a French league, diſtant from one another. There is no public poſt-office in China, though ſeveral private ones have been eſtabliſhed; but the couriers and officers charged with diſpatches for the empire have only a right to uſe them. This inconvenience, however, excepted, travellers find conveyance very eaſy from one part of China to another. Porters are employed in every city, who are aſſociated under the conduct of a chief, who regulates all their engagements, fixes the price of their labour, receives their hire, and is reſponſible for every thing they carry. On all the great roads in China there are ſeveral offices of this kind, which have a ſettled correſpondence with others; the travellers therefore have only to carry to one of theſe offices, a liſt of ſuch things as they wiſh to have tranſported: this is immediately written down in a book; and though there ſhould be occaſion for 200 or even 400 porters, they are inſtantly furniſhed. Every thing is weighed before the eyes of their chief, and the hire is 5 pence per cwt. for one day's carriage. An exact regiſter of every thing is kept in the office; the traveller pays the money in advance, receives a ticket for each porter he requires, to give them when they have conveyed their load to the appointed place, for which they receive payment from the chief on their return. The traveller has no farther trouble: on his arrival at the intended place, his baggage is found at the correſponding office, and every thing is delivered to him with the moſt ſcrupulous exactneſs. The cuſtom-houſes are regulated by the general police, and, according to M. Groſier, the cuſtom-houſe officers are the moſt civil in the world. They have no concern with any claſs of people but the merchants, whom they take care not to diſtreſs by any rigorous exactions; neither, though they have authority, do they ſtop travellers till their baggage is examined, nor do they ever require the ſmalleſt fee from them. Duties are paid either by the piece or the load; and in the former caſe credit is given to the merchant's book without aſking queſtions. A mandarin is appointed by the viceroy of each province, to inſpect the cuſtom-houſes of the whole diſtrict; and the mandarins have alſo the care of the poſt offices.

(35.) **CHINA, SEALS, IMPERIAL, HONORARY, &c. OF.** No law or ſentence, is of any force, until the emperor's ſeal has been affixed to it. This is about 8 inches ſquare, and is made of fine jaſper, a kind of precious ſtone much eſteemed in China; of which only the emperor is allowed to have a ſeal. Thoſe given to princes as marks of honour are compoſed of gold; the ſeals of the viceroys and great mandarins, of ſilver; while thoſe of inferior mandarins and magiſtrates are made only of lead or copper. The ſize of theſe ſeals is greater or ſmaller according to the rank their poſſeſſors hold in the tribunals or as mandarins; and when any of them happens to be worn out, intimation muſt be ſent to the next ſuperior tribunal; on which a new one is ſent, and the old one muſt then be delivered up. The commiſſion of every inſpector ſent into the provinces muſt alſo be confirmed by the emperor's ſeal.

(36.) **CHINA, SEPULCHRES, AND FUNERAL HALLS IN.** The burying places in China are always ſituated at a ſmall diſtance from a city or town, and generally upon ſome eminence, having pines or cypreſſes uſually planted around them. The form of the tombs is various, according to the different provinces, and the ſituation of thoſe for whom they are intended. The coffins of the poor are placed under a ſhade covered with thatch, or incloſed in a ſmall building of brick in the form of a tomb. The tombs of the rich are ſhaped like a horſe ſhoe, well whitened and finiſhed with great taſte; but thoſe of the mandarins and people of quality are much more elegant. A vault is firſt conſtructed, in which the coffin is ſhut up; over this vault is raiſed a pyramid of earth well beaten together, about 12 feet in height and 10 in diameter. A layer of lime and ſand laid over this earth makes a kind of plaſter, which renders the whole very durable and ſolid; various kinds of trees being planted around it in regular order. Before it is placed a long table of white marble, on the middle of which are ſet a cenſer accompanied with two vaſes, and two candleſticks of exquiſite workmanſhip. Beſides this, a great number of figures, repreſenting officers, eunuchs, ſoldiers, ſaddled horſes, camels, lions, tortoiſes, &c. are ranged round the tombs in different rows; which produce a very ſtriking effect. When a Chineſe dies in a province in which he was not born, his children have a right, nay it is their indiſpenſable duty, to tranſport the body to the burying place of their anceſtors. A ſon, who ſhould be wanting in this reſpect, would be diſgraced, and his name never placed in the *hall* of his anceſtors. This hall is a vaſt building, conſidered as common to all the branches of the ſame family, and to which they all repair at a certain ſeaſon of the year. Sometimes they amount to 7000 or 8000 perſons, whoſe fortune, dignity, and rank in ſociety, are all very different; but there is no diſtinction of rank known; age only gives precedence, and the oldeſt always takes place of all the reſt, though he ſhould be the pooreſt in the company. The diſtinguiſhing ornament of this hall is a long table ſet againſt the wall, upon which is generally ſeen the image of one of their anceſtors, who has filled ſome office of diſtinction in the empire, or has been rendered illuſtrious by his abilities. Sometimes it only contains the names of men, women, and children belonging to the family, inſcribed upon tablets, with their age, the day of their death, and the dignities they enjoyed. Theſe tablets are ranged in two rows upon ſteps, and are only about a foot high each. In ſpring, and ſometimes in autumn, the relations of the deceaſed repair to this hall, where the only privilege enjoyed by the richeſt is that of treating the whole family; but they never allow themſelves to taſte a bit of any thing until an offering has been firſt made to their anceſtors. This does not, however, excuſe them from viſiting the real tomb of their anceſtors once or twice a-year. In April they pluck the weeds from around the tomb, renew their expreſſions of grief, and conclude by placing upon it wine and proviſions, which ſerve to dine their aſſiſtants. See CHINESE, § 12.

(37.) **CHINA, SHIPPING OF.** For ſeveral centuries the Chineſe have made no progreſs in ſhip-building. Their veſſels have neither mizzen, bowſprit, nor top-maſt. They have only a main and fore-maſt, to which is ſometimes added a ſmall top-gallant maſt. The main maſt is placed almoſt in the ſame part of the deck as ours; but the fore maſt ſtands much farther forward. The latter is to the former in the proportion of two to three; and the main maſt is generally two 3ds of the length of the veſſel. They uſe mats for ſails, ſtrengthening them with whole bamboos equal in length to the breadth of the ſail, and extended acroſs it, at the diſtance of a foot from one another. Two pieces of wood are fixed to the top and bottom of the ſail; the upper ſerves as ſail-yard; and the lower, which is about 5 or 6 inches thick, keeps the ſail ſtretched, when it is neceſſary to hoiſt or lower it. This kind of ſail may be folded or unfolded like a ſcreen. For caulking their veſſels they uſe a particular kind of gum mixed with lime, which forms a compoſition of ſuch excellent quality, that 1 or 2 wells in the hold are ſufficient to keep the veſſel dry. They have not yet adopted the uſe of pumps, and therefore draw up the water with buckets. Their anchors are made of the hard wood, called *iron wood*, which they ſay is much ſuperior to the metal, becauſe the latter ſometimes bend, but the former never do. The Chineſe pretend to have been the firſt inventors of the mariner's compaſs, but ſeem to have little inclination to improve ſuch an important machine: however, they are well acquainted with the art of manœuvring a veſſel, and make excellent coaſting pilots, though they are bad ſailors in an open ſea.

(38.) **CHINA, TRADE OF.** The commerce of China is under the inſpection of the tribunal of finances; but on this ſubject the Chineſe entertain an opinion quite different from that of the Europeans. Commerce, according to them, is only uſeful, as far as it eaſes the people of their ſuperfluities, and procures them neceſſaries. For this reaſon they conſider even that which is carried on at Canton as prejudicial; and that the only commerce advantageous to their empire is that with Ruſſia and Tartary; by which they are ſupplied with thoſe furs ſo neceſſary in the northern provinces. The diſputes concerning the limits of Ruſſia and China ſeem to have paved the way to this commerce. Theſe diſputes were ſettled by treaty on the 27th Aug. 1689, in the reign of John and Peter Alexiowitz. The chief of the embaſſy on the part of Ruſſia was Golovin governor of Siberia; two Jeſuits were deputed on the part of the emperor of China; and the conferences were held in Latin, with a German in the Ruſſian ambaſſador's train, who was acquainted with that language. By this treaty the Ruſſians obtained a regular and permanent trade with China, which they had long deſired; but in return they yielded up a large territory, beſides the navigation of the river Amour. The firſt intercourſe had taken place in the beginning of the 17th century; at which time a ſmall quantity of Chineſe merchandize was procured by ſome Ruſſian merchants from the Kalmuck Tartars. The rapid and profitable ſale of theſe commodities encouraged certain Siberian Waywodes to attempt a direct and open communication with China. For this purpoſe ſeveral deputations were ſent to the emperor; and though they failed of obtaining the grant of a regular commerce, their attempts were attended with ſome conſequences of importance. Thus the Ruſſian merchants were tempted to ſend traders to Peking; by which a faint connection was preſerved with that metropolis. This commerce, however, was at laſt interrupted by the commencement of hoſtilities on the river Amour; but after the concluſion of the treaty in 1689, was reſumed with uncommon alacrity on the part of the Ruſſians: and the advantages thence ariſing were found to be ſo conſiderable, that a deſign of enlarging it was formed by Peter the Great. Iſbrand Ides, a native of Holſtein, then in the Ruſſian ſervice, was therefore diſpatched to Peking in 1692; by whoſe means the liberty of trade, before confined to individuals, was now extended to caravans. In the mean time, private merchants continued to trade as before, not only with the Chineſe, but alſo at the head quarters of the Mogul Tartars. The camp of theſe roving Tartars, which was generally ſtationed near the confluence of the Orhon and Toula rivers, between the ſouthern frontiers of Siberia and the Mogul deſert, thus became the ſeat of an annual fair. Complaints, however, were ſoon made of the diſorderly behaviour of the Ruſſians; on which the Chineſe monarch threatened to expel them from his dominions, and to allow them neither to trade with the Chineſe nor Moguls. This produced another embaſſy to Peking in 1719, when matters were again adjuſted. But this reconciliation was of no long duration; for the Ruſſians having renewed their diſorderly behaviour, an order for their expulſion was iſſued in 1722. The differences were once more made up in 1727, and a caravan allowed to go to Peking once in 3 years, provided it conſiſted of no more than 100 perſons; and that during their ſtay their expenſes ſhould not, as formerly, be detrayed by the emperor of China. The Ruſſians, at the ſame time obtained permiſſion to build a church within the precincts of the caravanſary; and four prieſts were allowed to reſide at Peking for the celebration of divine ſervice; the ſame indulgence being granted to ſome Ruſſian ſcholars, for the purpoſe of learning the Chineſe language, and qualifying themſelves for being interpreters between the two nations. This intercourſe continued till 1755; ſince which time no more caravans have been ſent to China. It was firſt interrupted by a miſunderſtanding betwixt the two courts; and though that difference was afterwards made up, no caravans have been ſent ever ſince. The late empreſs of Ruſſia, ſenſible that the monopoly of the fur trade (which was entirely confined to the caravans belonging to the crown, and prohibited to individuals) was prejudicial to commerce, gave it up in favour of her ſubjects in 1762; and the centre of commerce betwixt the two nations is now at Kiatka. The trade is entirely carried on by barter. The Ruſſians are prohibited from exporting their own coin; finding it more advantageous to take goods in exchange than to receive bullion at the Chineſe ſtandard. The principal exports from Ruſſia are furs of different kinds; the moſt valuable of which are thoſe of ſea-otters beavers, wolves, foxes, martins, ſables, and ermines; the greater part of which are brought from Siberia and the newly diſcovered iſlands; but as they cannot ſupply the demand, there is a neceſſity for importing foreign furs to Peterſburg, which are afterwards ſent to Kiatka. Various kinds of cloth are likewiſe ſent to China, as well as hardware, and live cattle, ſuch as horſes, camels, &c. The exports from China are, raw and manufactured ſilk, cotton, porcelain, rhubarb, muſk, &c. The government of Ruſſia likewiſe reſerves to itſelf the excluſive privilege of purchaſing rhubarb. It is brought to Kiatka by ſome Buckharian merchants, who have entered into a contract to ſupply the crown with it in exchange for furs; the exportation of the beſt rhubarb is forbidden under ſevere penalties, but yet is procured in ſufficient quantities, ſometimes by clandeſtinely mixing it with inferior roots, and ſometimes by ſmuggling it directly. Great part of Europe is ſupplied with rhubarb from Ruſſia.—The internal commerce of China is much greater than that of all Europe. It is greatly facilitated by the vaſt number of canals and rivers with which the country is interſected. The Chineſe, however, are not at all fitted for foreign trade. Few of their veſſels go beyond the ſtraits of Sunda; their longeſt voyages to Malacca extend only as far as Acheen, towards the ſtraits of Batavia, and northward to Japan. Their commerce with the laſt mentioned iſland, and with Camboya or Siam, produces them cent per cent. Their trade with the Manillas brings only about 50 per cent. The Chineſe traders go alſo, though not very frequently, to Acheen, Malacca, Thor, Patan, Ligon, and Cochin China; whence they bring gold and tin, with objects of luxury for the table. The great obſtacles to the foreign commerce of the Chineſe are their indifference about maritime affairs, and the bad conſtruction of their veſſels. This they acknowledge; but ſay, that any attempt to remove it would be derogating from the laws, and ſubverting the conſtitution of the empire.

(39.) CHINA, VICEROYS OF. The viceroys are diſtinguiſhed by the title of TSONG-TOU, and are always mandarins of the firſt claſs, poſſeſſing an almoſt unlimited power within their diſtricts. They march abroad with all the pomp of royal magnificence, never quitting their palaces, on the moſt trifling occaſion, without a guard of 100 men. A viceroy is the receiver general of all the taxes collected in the province, tranſmitting them to the capital, after having reſerved what he judges neceſſary for the demands of his diſtrict. All law ſuits muſt be brought before his tribunal; and he has the power of paſſing ſentence of death, but it cannot be put in execution without being firſt carried to the emperor. Every 3 years he ſends to court a report of the conduct of the mandarins ſubordinate to him; and according to the contents they are either continued or diſgraced. Thoſe of whom he makes an unfavourable report are puniſhed in proportion to their delinquency; while, on the other hand, thoſe who are well reported, are rewarded.

(40.) CHINA, WALL OF. The principal defence of the empire againſt a foreign enemy is the great wall which ſeparates China from Tartary, extending more than 1500 miles in length, and of ſuch thickneſs that ſix horſemen may eaſily ride abreaſt upon it. It is flanked with towers two bow-ſhots diſtant from one another; Walker ſays there are 45,000 of theſe towers; a number rather incredible, and that the wall extends 2000 miles. It is ſaid that a third of the able-bodied men in the empire were employed in conſtructing this wall. The workmen were ordered, under pain of death, to place the materials ſo cloſely, that not the leaſt entrance might be afforded for any inſtrument of iron; and thus the work was conſtructed with ſuch ſolidity, that it is ſtill almoſt entire, though 2000 years have elapſed ſince it was conſtructed. This extraordinary work is carried not only through the low lands and valleys, but over hills and mountains; the height of one of which was computed by F. Verbieſt at 1236 feet above the level of the ſpot where he ſtood. According to F. Martini it begins at the gulf of Lea-tong, and reaches to the mountains near the city of Kin on the yellow river; between which places it meets with no interruption except to the N. of the city of Suen in Pecheli, where it is interrupted by a ridge of inacceſſible mountains, to which it is cloſely united. It is likewiſe interrupted by the river Hoang-ho; but for others of an inferior ſize, arches have been conſtructed, through which the water paſſes freely. Mr Bell informs us, that it is carried acroſs rivers, and over the tops of the higheſt hills, without the leaſt interruption, keeping nearly along that circular range of barren rocks which incloſes the country; and, after running about 1200 miles, ends in impaſſable mountains and ſandy deſerts. The foundation conſiſts of large blocks of ſtone laid in mortar; but all the reſt is of brick. The whole is ſo ſtrong and well built, that it ſcarcely needs any repairs; and, in the dry climate in which it ſtands, may remain in the ſame condition for many ages. When carried over ſteep rocks, where no horſe can paſs, it is about 15 or 20 feet high; but when running through a valley, or croſſing a river, it is about 30 feet high, with ſquare towers and embraſures at equal diſtances. The top is flat, and paved with cut ſtone; and where it riſes over a rock or eminence, there is an aſcent made by an eaſy ſtone ſtair. "This wall (our author adds) was begun and completely finiſhed in the ſhort ſpace of 5 years; and it is reported, that the labourers ſtood ſo cloſe for many miles, that they could hand the materials from one to another. This ſeems the more probable, as the rugged rocks among which it is built muſt have prevented all uſe of carriages; and neither clay for making bricks, nor any kind of cement, are to be found among them."

(II. 1.) * CHINA. *n. ſ.* [from *China*, the country where it is made.] China ware; porcelain; a ſpecies of veſſels made in China, dimly tranſparent, partaking of the qualities of earth and glaſs. They are made by mingling two kinds of earth, of which one eaſily vitrifies; the other reſiſts a very ſtrong heat: when the vitrifiable earth is melted into glaſs they are completely burnt.—After ſupper, carry your plate and *china* together in the ſame baſket. *Swift.*

(2.) * CHINA-ORANGE. *n. ſ.* [from *China* and *orange.*] The ſweet orange; brought originally from China.—Not many years has the *China-orange* been propagated in Portugal and Spain. *Mortimer's Huſb.*

(3.) * CHINA-ROOT. *n. ſ.* [from *China* and *root.*] A medicinal root, brought originally from China.

(4.) CHINA ROOT, in the materia medica, the root of a ſpecies of SMILAX, brought both from the Eaſt and Weſt Indies; and thence diſtinguiſhed into ORIENTAL and OCCIDENTAL. Both ſorts are longiſh, full of joints, of a pale reddiſh colour with no ſmell, and very little taſte. The oriental, which is moſt eſteemed, is conſiderably harder and paler than the other. Such ſhould be choſen as are freſh, cloſe, heavy, and upon being chewed appear full of a fat unctuous juice. It is generally ſuppoſed to promote inſenſible perſpiration and the urinary diſcharge, and by its unctuous quality to obtund acrimonious juices. China root was firſt brought into Europe in 1535, and uſed as a ſpecific againſt venereal and cutaneous diſorders With this view it was made uſe of for ſome time; but has long ſince given place to more powerful medicines.

(5.) China rose, in botany. See Hibiscus.

(6.) China ware. See Porcelain.

CHINCA, a town of South America, in Peru, ſituated in a valley of the ſame name, where the ancient incas had formerly built a temple dedicated to the ſun. It once contained 25,000 inhabitants, now reduced to about 500 families. It lies miles N. of Piſco.

CHINCHILLA, a town of Spain, in the province of Murcia, 25 leagues SW. of Valencia. Lon. 14. 15. E. of Teneriffe. Lat. 38. 48. N.

CHINCHIO, a town of European Turkey, in the province of Dalmatia, 6 miles E. of Spalatro.

CHINCON, a town of Spain, in New Caſtile, 18 miles ESE. of Madrid.

(1.) * CHINCOUGH. *n. ſ.* [perhaps more properly *kincough*, from *kinckin*, to pant, Dutch; and *cough*.] A violent and convulſive cough, to which children are ſubject.—I have obſerved a *chincough*, complicated with an intermitting fever. *Floyer*.

(2.) Chincough. See Medicine, *Index*.

* CHINE. *n. ſ.* [*eſchine*, Fr. *ſchiena*, Ital. *ſpina*, Lat. *cein*, Arm.] 1. The part of the back, in which the ſpine or backbone is found.—She ſtrake him ſuch a blow upon his *chine*, that ſhe opened all his body. *Sidney*. 2. A piece of the back of an animal.—Cut out the burly-boned clown in *chines* of beef ere thou ſleep. *Shakeſp.*

* *To* Chine. *v. a.* [from the noun.] To cut into chines.

(1.) CHINESE. *adj.* belonging to China.

(2.) Chinese. *n. ſ. plur.* the people of China. The Chineſe, in their perſons, are middle-ſized, their faces broad, their eyes black and ſmall, their noſes rather ſhort. They have ſingular ideas of beauty. They pluck up the hairs of the lower part of their faces by the roots with tweezers, leaving a few ſtraggling ones by way of beard. Their Tartar princes compel them to cut off the hair of their heads, and to wear only a lock on the crown. Their complexion towards the N. is fair, towards the S. ſwarthy, and the fatter a man is, they think him the handſomer. Men of rank and learning, who are not much expoſed to the ſun, are of a delicate complexion, and thoſe who are bred to letters let the nails of their fingers grow to an enormous length, to ſhew that they are not employed in manual labour. The women have little eyes, plump roſy lips, black hair, regular features, and a delicate though florid complexion. "The exterior demeanor of the Chineſe (ſays Sir G. Staunton,) is very ceremonious. It conſiſts of various evolutions of the body, and inclinations of the head, in bending or ſtiffening the knee, and in joining or diſengaging the hand; all which are conſidered as the perfection of good-breeding and deportment; while the nations who are not expert in ſuch diſcipline are thought to be little better than barbarians. When, however, thoſe Chineſe ceremonies are ſhown off, the performers of them relapſe into eaſy familiarity. In their addreſs to ſtrangers, they are not reſtrained by any baſhfulneſs, but preſent themſelves with an eaſy, confident air, as if they conſidered themſelves as the ſuperiors, and as if nothing in their manners or appearance could be deficient or inaccurate."

(3.) Chinese bonzes. The bonzes of China are repreſented as a moſt avaricious and hypocritical race of men, ready to practiſe every kind of villainy, and even to ſubject themſelves to the moſt intolerable tortures, to obtain money from the compaſſion of the public. See Bonzes, § 2. An edict of one of the emperors is cited by M. Groſier, by which great numbers of their religious houſes were ſuppreſſed. To perpetuate their ſect, they purchaſe young children, whom they inſtruct in all the myſteries and tricks of their profeſſion; but they are in general very ignorant, and few of them would be able to give any tolerable account of the tenets of their ſect. They are not ſubject to a regular hierarchy, but acknowledge ſuperiors whom they call grand bonzes, who have the firſt place in all religious aſſemblies at which they happen to be preſent. Their wealth is augmented by pilgrimages to certain places where there are temples more or leſs reverenced, and where a multitude of abſurd ceremonies are performed. Theſe bonzes are inveterate enemies to Chriſtianity, telling the moſt abſurd ſtories concerning the miſſionaries; as that they pluckt out the eyes of their converts to conſtruct teleſcopes with, &c. The literati, and the ſenſible part of the nation, hold them in the greateſt contempt.

(4.) Chinese, character of the. M. Groſier, who ſeems inclined to give a favourable idea of the Chineſe, is obliged to confeſs that in their commercial dealings, they are as diſhoneſt and knaviſh a race as any that exiſt. "The moſt frequented fairs of Europe (ſays he) afford but a faint idea of that immenſe number of buyers and ſellers with which the large cities of China are continually crowded. We may almoſt ſay, that the one half are employed in over-reaching the other; but againſt ſtrangers, the Chineſe merchants exerciſe, without any ſenſe of ſhame, their inſatiable rapacity. Of this F. du Halde gives one ſtriking example out of many: "The captain of an Engliſh veſſel bargained with a Chineſe merchant at Canton for ſeveral bales of ſilk, which the latter was to provide againſt a certain time. When they were ready, the captain went with his interpreter to the houſe of the Chineſe merchant, to examine whether they were ſound. On opening the firſt bale, he found it according to his wiſh, but all the reſt were good for nothing. The captain on this fell into a great paſſion, and reproached the merchant in the ſevereſt terms for his diſhoneſty. The Chineſe, after having heard him for ſome time with great coolneſs, replied, 'Blame, Sir, your knave of an interpreter; he aſſured me that you would not inſpect the bales.' The lower claſs of people are very dexterous in counterfeiting and adulterating every thing they ſell. Sometimes you think you have bought a capon, and you receive nothing but ſkin; all the reſt has been ſcooped out, and the place ſo ingeniouſly filled up, that the deception cannot be diſcovered till the moment you begin to eat it. The counterfeit hams of China have been often mentioned. They are made of a piece of wood cut in the form of a ham, and coated over with a certain kind of earth which is covered with hog's ſkin. The whole is ſo curiouſly painted and prepared, that a knife is neceſſary to detect the fraud. Mr Oſbeck relates, that having one day obſerved a blind man carrying about for ſale ſome of thoſe trees called by the Chineſe *Fo-kei*, he purchaſed one, which to appearance had fine double red and white flowers; but on cloſer examination, he found that the flowers were taken from another tree, and that one calyx was ſo neatly fitted into the other, with nails made of bamboo, that he ſhould ſcarcely have diſcovered the deceit, had not the flowers begun to wither. The tree itſelf had buds, but not one open flower. The robbers in China ſignalize themſelves alſo by their dexterity and ingenuity, which they diſplay in their profeſſion. They ſeldom have recourſe to acts of violence, but introduce themſelves into a houſe either privately, or by forming ſome connection with the family. It is as difficult in China to avoid robbery, as it is to apprehend the criminal in the fact. If we are deſirous of finding among the Chineſe openneſs of temper, benevolence, friendſhip, and virtue, we muſt not ſeek for it in cities, but in the boſom of the country, among that claſs of men who have devoted themſelves to labour and agriculture." On the whole, the Europeans are perhaps not ſufficiently acquainted with the interior parts of China, to form an accurate judgment of the character of the people in general; and it ſeems not fair to characteriſe a great nation from a few inſtances of villainy, however, well atteſted. By ſome authors, the Chineſe appear to be too much degraded; and by others too extravagantly praiſed.

(5.) **CHINESE, CUSTOMS PECULIAR TO THE.** All authors agree, that an abſurd cuſtom prevails throughout China of confining the feet of female infants in ſuch a manner, that they are never allowed to grow to near their full ſize. "Of moſt of the women we ſaw, (ſays Sir G. Staunton,) even in the middle and inferior claſſes, the feet were unnaturally ſmall, or rather truncated. They appear as if the fore part of the foot had been accidentally cut off, leaving the remainder of the uſual ſize, and bandaged like the ſtump of an amputated limb. They undergo, indeed, much torment, and cripple themſelves in a great meaſure, in imitation of ladies of higher rank, among whom it is the cuſtom to ſtop by preſſure the growth of the ancle as well as foot from the earlieſt infancy; and leaving the great toe in its natural poſition, forcibly to bend the others, and retain them under the foot, till at length they adhere to, as if buried in, the ſole, and can no more be ſeparated. It is ſaid, indeed, that this practice is now leſs frequent than formerly, at leaſt among the lower ſort in the northern provinces." In China every father of a family is reſponſible for his children, and even his domeſtics; all thoſe faults being imputed to him which it was his duty to have prevented. Every father has the power of ſelling his ſon, "provided (ſays the law) the ſon has a right of ſelling himſelf." This cuſtom, however, is barely tolerated among the middling and inferior ranks; and all are forbidden to ſell them to comedians, or people of infamous character, or very mean ſtations. In China a ſon remains a minor during his father's life, and is even liable for the debts contracted by him, thoſe from gaming only excepted. Adoption is authoriſed by law, and the adopted child immediately enters into all the rights of a lawful ſon; only the law gives a right to the father of making a few diſpoſitions in favour of his real children. The children, however, whether real or adopted, cannot ſucceed to the dignity of their father, though they may to his eſtate. The emperor alone can confer honours; and even then they muſt be reſigned when the perſon attains the age of 70; though this reſignation is conſidered as an advice rather than a law. The will of a father cannot be ſet aſide in China on account of any informality; nor can a mother make a will.

(6.) **CHINESE DIVERSIONS.** The only diverſions of the Chineſe are hunting and fiſhing; dancing not being practiſed, and gaming forbidden by law. They catch fiſh by various methods; uſing nets in their great fiſheries, but lines in their private. In ſeveral provinces alſo they uſe a certain kind of bird, whoſe plumage greatly reſembles that of a raven, but it has a much longer bill, very ſharp and hooked. This method of fiſhing is practiſed in boats, of which great numbers may be ſeen on the river about ſun-riſing, with the fiſhing birds perched on their prows. Theſe birds are taught to catch fiſh almoſt in the ſame manner that dogs purſue game. The fiſhermen beat the water ſtrongly with their oars. This ſerves as a ſignal to the birds, who inſtantly plunge into the water, and diving, ſwallow as many ſmall fiſh as they can, repairing immediately afterwards to the boat, and carrying a large one by the middle in their bills. The ſmall ones are prevented from paſſing into the ſtomach by a ring placed to confine the bird's gullet: and the fiſherman by ſtroaking its neck with the head downwards, makes the bird diſgorge all the ſmall fiſh. When they have done fiſhing, the rings are taken off, and the birds allowed to feed. When the fiſh happens to be too large for a ſingle bird, the others have the ſagacity to aſſiſt it; one taking it by the tail, another by the head, &c. and thus they tranſport it to their maſter. Another method of fiſhing, practiſed only in China, is as follows: They nail a board, about two feet in breadth, which is covered with a white ſhining kind of varniſh, upon the edges of a long narrow boat, from one end to the other. This board is placed in ſuch a manner as to ſlope almoſt imperceptibly to the water. It is uſed only in the night, and is always turned towards the moon, that the reflection of the light may increaſe the ſplendor of the varniſh. The fiſh, in ſporting, often miſtake this varniſhed board for water; and endeavouring to throw themſelves into it, fall into the boat. The ſoldiers have a particular method of fiſhing with bows and arrows; the latter of which are fixed to the bows by ſtrings, to prevent them from being loſt, and to draw out the fiſh which the arrows have pierced. Others uſe tridents to catch large fiſh which are ſometimes found in the mud. Beſides theſe diverſions, the Chineſe have ſome ſtrolling players, but no regular theatres; they have likewiſe muſicians and ſingers, but no operas, or indeed any public ſpectacle worthy of notice.

(7.) **Chinese dresses.** There is little diſtinction in China between the ordinary dreſs of men and women. Rank and dignity are diſtinguiſhed by certain acceſſary ornaments; and the perſon would be ſeverely chaſtiſed, who ſhould preſume to aſſume them without being properly authoriſed. The dreſs in general conſiſts of a long veſt which reaches to the ground. The left ſide folds over the other, and is faſtened to the right by four or five ſmall gold or ſilver buttons, placed at a little diſtance from one another. The ſleeves are wide towards the ſhoulder, growing narrower as they approach the wriſt, where they terminate in the form of a horſe ſhoe, covering the hands entirely, and leaving nothing but the ends of the fingers to be ſeen. Round the middle they wear a large girdle of ſilk, the ends of which hang down to their knees. From this girdle is ſuſpended a ſheath, containing a knife and two ſmall ſticks which they uſe as forks. Below this robe they wear a pair of drawers, in ſummer made of linen, and in winter of ſatin lined with fur, ſometimes of cotton, and in ſome of the northern provinces of ſkins. Thoſe are ſometimes covered with another pair of white taffety. Their ſhirts are always very ſhort and wide. Under theſe they wear a ſilk net to prevent it from adhering to the ſkin. In warm weather they have their necks always bare; in cold, they wear a collar made of ſilk, ſable, or fox's ſkin, joined to their robe, which in winter is trimmed with ſheep's ſkin, or quilted with ſilk and cotton. That of people of quality is lined with beautiful ſable ſkins brought from Tartary, or with the fineſt fox's ſkin, trimmed with ſable; in ſpring it is lined with ermine. Above their robe they wear alſo a kind of ſur-tout, with wide ſleeves, but very ſhort, and lined in the ſame manner. The emperor and princes of the blood only have a right to wear yellow; certain mandarins have liberty to wear ſatin of a red ground, but only upon days of ceremony; in general they are clothed in black, blue, or violet. The inferior ranks are allowed to wear no other colours but blue or black; and their dreſs is always compoſed of plain cotton cloth. Formerly the Chineſe were at great pains to preſerve their hair; but the Tartars compelled them to cut off the greater part of it, and to alter the form of their clothes after their faſhion. This revolution in dreſs was not effected without bloodſhed, though the conqueror at the ſame time adopted in other reſpects the laws, manners, and cuſtoms of the conquered people. Thus the Chineſe are painted as if bald, but they are not ſo naturally; that ſmall portion of hair which they preſerve behind, or on the tops of their heads, is all that is now allowed them. This they wear very long, and plaited like a tail. In ſummer they wear a cap ſhaped like an inverted cone, lined with ſatin, and covered with ratan or cane very prettily wrought. The top terminates in a point, to which they fix a tuft of red hair, which ſpreads over it and covers it to the brims. This hair grows between the legs of a ſpecies of cow, and is capable of taking any colour, eſpecially a deep red. The mandarins and literati wear a cap of the ſame form; only it is lined with red ſatin, and covered on the outſide with white. A large tuft of the fineſt red ſilk is fixed over it, which hangs down or waves with the wind. People of diſtinction generally uſe the common cap on horſeback or during bad weather, to keep off rain, and ſhelter them from the rays of the ſun. In winter they have another cap bordered with ſable, ermine, or fox's ſkin, and ornamented with a tuft of ſilk like the former. Theſe fur trimmings have ſometimes 40 or 50 oz. of ſilver upon them. People of rank never go abroad without boots made of ſatin or ſome other ſilk, and ſometimes of cotton, but always dyed. They have neither heel nor top, but are made to fit the foot exactly. When on horſeback, however, they have others made of the ſkin of a cow or a horſe, and very pliable. The inferior ranks wear black ſlippers made of cotton cloth. The fan is alſo an appendage of the Chineſe dreſs, reckoned equally neceſſary with the boots. The dreſs of the women conſiſts of a long robe cloſe at top, and long enough to cover even their toes, with ſleeves ſo long that they would hang down upon the ground, did they not take care to tuck them up; but their hands are ſeldom ſeen. The colour of their dreſſes is entirely arbitrary, but black and violet are generally choſen by thoſe advanced in life. The young ladies uſe paint, to give a bloom to their complexions; which ſoon wrinkles the ſkin. Their head-dreſs conſiſts in arranging their hair in ſeveral curls, interſperſed with tufts of gold or ſilver flowers. According to Du Halde, ſome of them ornament their heads with the image of a fabulous bird, concerning which many ſtories are told. This is made of copper or ſilver gilt, its wings extended and pretty cloſe to the head-dreſs, embracing the upper part of their temples, while the long ſpreading tail forms a kind of plume on the top of the head. Its body is directly over the head, and the neck and bill hang down, the former being joined to the body by a concealed hinge, that it may play freely, and move about on the leaſt motion of the head. The whole bird adheres to the head by the claws, which are fixed in the hair. Ladies of quality ſometimes wear ſeveral of theſe birds made up into a ſingle ornament, the workmanſhip of which is very expenſive. Young ladies wear alſo a crown of paſteboard, the fore part of which riſes in a point above the forehead, and is covered with jewels. The reſt of the head is decorated with natural or artificial flowers, among which ſmall diamond pins are interſperſed. The head dreſs of the ordinary claſs of women, eſpecially when advanced in years, conſiſts only of a piece of very fine ſilk wrapped round their heads. The Chineſe uſe white as the colour proper for mourning. A ſon can uſe no other for three years after the death of his father or mother; and ever afterwards his clothes muſt be of one colour. The law has forbidden the uſe of ſilks and furs to children; and has even preſcribed the time when they are firſt to wear a cap. This is put upon their heads by the maſter of ceremonies, who addreſſes them in the following manner: "Conſider that you now receive the dreſs of thoſe who have attained to maturity, and that you ceaſe to be children; renounce therefore all childiſh thoughts and inclinations; aſſume a grave and ſerious deportment; apply with reſolution to the ſtudy of virtue and wiſdom, and endeavour to merit a long and happy life."

(8.) **CHINESE DYNASTIES.** See CHINA, § 7.

(9.) **CHINESE, EDUCATION OF THE.** The book of ceremonies directs the education of a child to commence as ſoon as it is born, and deſcribes the qualities which its nurſe ought to have. She muſt ſpeak little, adhere ſtrictly to truth, have a mild temper, behave with affability to her equals, and with reſpect to her ſuperiors. The child is taught to uſe the right hand as ſoon as it can put its hand to its mouth, and then it is weaned. At 6 years of age, if a male, he is taught the numbers moſt in uſe, and made acquainted with the names of the principal parts of the world; at 7 he is ſeparated from his ſiſters, and no longer allowed to eat with them, nor to ſit down in their preſence; at 8 he is inſtructed in the rules of good breeding and politeneſs; at 9 he ſtudies the kalendar; at 10 he is ſent to a public ſchool, where he learns to read, write, and caſt accounts; from 13 to 15 he is taught muſic, and every thing that he ſings conſiſts of moral precepts. It was formerly the cuſtom, that all the leſſons deſigned for the Chineſe youths were in verſe; and it is to this day lamented, that the ſame cuſtom is not followed, as their education has ſince been rendered much more difficult and laborious. At 15, the Chineſe boys are taught to handle the bow and arrow, and to mount on horſeback; at 20 they receive the firſt cap, if they are thought to deſerve it, and they are permitted to wear ſilk dreſſes ornamented with furs; but before that period they are not allowed to wear any thing but cotton. Another method of initiating children into the principles of knowledge in this empire is, by ſelecting a number of characters expreſſive of the moſt common objects, engraving or painting them ſeparately on ſome kind of ſubſtance, and, under the thing repreſented, putting the name, which points out to the children the meaning of the word. As the Chineſe have no alphabet, they repreſent almoſt every thing by different characters. The labour of their youth, therefore, is intolerable; being obliged to ſtudy many thouſand characters, each of which has a different ſignification. Some idea of their difficulties may be obtained, from what we are told by F. Martini, who aſſures us, that he was under the neceſſity of learning 60,000 different characters before he could read the Chineſe books with tolerable eaſe. The book firſt put into the hands of children, points out what a child ought to learn, and the manner in which he ſhould be taught. This volume is a collection of ſhort ſentences, conſiſting of 3 or 4 verſes each, in rhyme; and they are obliged to give an account in the evening of what they have learned in the day. After this elementary treatiſe, they put into their hands the 4 books which contain the doctrines of Confucius and Mencius. The ſenſe and meaning of the work is never explained to them until they have got by heart all the characters, that is to ſay, the *words* in the book. While they are getting theſe words by heart, they are likewiſe employed in learning to form the characters with a pencil. For this purpoſe they are furniſhed with large leaves of paper, on which are written or printed with red ink very big characters; and theſe they are required to cover with black ink, and to follow exactly their ſhape and figure; which inſenſibly accuſtoms them to form the different ſtrokes. After this they are made to trace ſmaller characters deſigned in black, and placed under the paper on which they write. Great pains is taken in forming the hands of young people, particularly ſtudents of literature. After the ſcholar has made himſelf maſter of the characters, he is allowed to compoſe; but the ſubject is pointed out to him only by one word. Competitions are alſo eſtabliſhed in China, but moſt of them are of a private nature: 20 or 30 families, all of the ſame name, and who conſequently have only one hall for the names of their anceſtors, agree among themſelves to ſend their children twice a month to this hall to compoſe. Each head of a family in turn gives the ſubject of this literary conteſt, and adjudges the prize; but this coſts him a dinner, in the hall of competition. A fine of about 10d. is impoſed on the parent of each ſcholar who abſents himſelf from this exerciſe. Every ſtudent is obliged to compete at leaſt twice a-year under the inſpection of an inferior mandarin of letters, ſtyled HIO-KOUAN. The mandarins often order the ſtudents to be brought before them, to examine the progreſs they have made in their ſtudies, and excite a ſpirit of emulation among them. Even the governors of cities order all thoſe ſtudents, who reſide near them, to appear before their tribunal once a month. The author of the beſt compoſition is honoured with a prize, and the governor treats all the candidates on the day of competition at his own expenſe. In every city, town, and village in China, there are ſchoolmaſters who teach ſuch ſciences as are known in that country. Parents poſſeſſed of a certain fortune have private inſtructors for their children. The education of the Chineſe women is confined to giving them a taſte for ſolitude, and accuſtoming them to modeſty and ſilence; and, if their parents are rich, they are likewiſe inſtructed in ſuch accompliſhments as may render them agreeable to the other ſex. Free ſchools are very numerous in every province of China, and even ſome of the villages are not deſtitute of this advantage. The ſons of the poor are there received as readily as thoſe of the rich; and from this obſcure ſource talents often ſpring, which afterwards make a conſpicuous figure on the grand ſtage of life.

(10.) **CHINESE ENTERTAINMENTS.** Nothing can appear more irkſome to an European than the multitude of ceremonies uſed on all occaſions by the Chineſe. An invitation to an entertainment is not ſuppoſed to be given with ſincerity, until it has been renewed three or four times in writing. A card is ſent the evening before the entertainment; a 2d on the morning of the appointed day, and a 3d when every thing is prepared. The maſter of the houſe introduces the gueſts into the hall, where he ſalutes them one after another. He then orders wine to be brought him in a ſmall cup, made of ſilver, porcelain, or precious wood, and placed upon a ſmall varniſhed ſalver. He lays hold of it with both his hands, makes a bow to all the ſurrounding gueſts, and advances towards the fore part of the hall, where he raiſes his eyes and the cup towards heaven; after which he pours the wine on the ground. He afterwards pours ſome wine into the cup, makes a bow to the principal perſon in company, and then goes to place the cup on the table before him; for in China every gueſt has a table to himſelf. The perſon for whom he intends this honour, however, generally ſaves him the trouble of placing the cup: calls for wine in his turn, and offers to place the cup on the maſter's table, who endeavours to prevent him; with a thouſand apologies and compliments according to the rules of Chineſe politeneſs. A ſuperior domeſtic conducts the principal gueſt to an elbow chair covered with rich flowered ſilk, where the ſtranger again begins his compliments, and begs to be excuſed from ſitting in ſuch an honourable ſeat, which, however, he accepts of; and all the reſt of the gueſts do the ſame, otherwiſe the ceremonial would be gone through with each of them. The entertainments of the Chineſe are begun, not by eating, but by drinking; and the liquor they drink muſt always be pure wine. The intendant, or *maitre de hotel*, falling down on one knee, firſt invites the gueſts to take a glaſs; on which each of them lays hold, with both hands, of that which is placed before him, raiſing it as high as his forehead, then bringing it lower down than the table, and at laſt putting it to his mouth: they all drink together, and very ſlowly, taking 3 or 4 draughts. While they are drinking, the diſhes on each of the tables are removed, and others brought in. Each of the gueſts has 24 ſet before him in ſucceſſion; all fat, and in the form of ragouts. They never uſe knives in their repaſts; and two ſmall pointed ſticks, ornamented with ivory or ſilver, ſerve them inſtead of forks. They never begin to eat, however, until they are invited by the *maitre de hotel*; and the ſame ceremony muſt be gone through every time they are going to take a cup of wine, or begin to a new diſh. Some change has been made in the ceremonial of the Chineſe by the Tartar conqueſt, and ſome new diſhes alſo introduced, for the Tartars are much better cooks than the Chineſe. All their diſhes are highly ſeaſoned; and by various proportions of ſpiceries, they form a variety of diſhes out of the ſame materials. None of their viands, however, are more eſteemed than ſtags ſinews; and the neſts of a particular ſpecies of birds, which give a moſt agreeable reliſh to whatever is mixed with them. Other diſhes are introduced at theſe repaſts, which would be accounted very diſagreeable with us; ſuch as the fleſh of wild horſes, the paws of a bear, and the feet of ſeveral wild animals. The greater part of theſe proviſions are brought preſerved in ſalt from Siam, Camboya, and Tartary. Towards the middle of the entertainment the ſoup is brought in, accompanied with ſmall loaves or pies. Theſe they take up with their ſmall ſticks, ſteep them in the ſoup, and eat them without waiting for any ſignal, or being obliged to keep time with the reſt of the gueſts. The entertainment, however, continues in other reſpects with the utmoſt formality, until tea is brought in; after which they retire from table, and amuſe themſelves in another hall, or in the garden for a ſhort time, until the deſert be brought in. This, like the entertainment itſelf, conſiſts of 24 diſhes, made up of ſweetmeats, fruits differently prepared, hams or ſalted ducks baked or dried in the ſun, with ſhell, and other kinds of fiſh. The ſame ceremonies which preceded the repaſt are now renewed, and every one ſits down at the ſame place he occupied before. Larger cups are then brought, and the maſter invites the gueſts to drink more freely. The entertainment is concluded by ſome theatrical repreſentations, accompanied with the muſic of the country. A certain number of ſpectators are admitted to behold theſe theatrical repreſentations; and even the women are allowed to view them through a wicket, ſo contrived, that they may ſee them without being ſeen themſelves. Theſe entertainments never end till midnight. A ſmall ſum of money is given to the domeſtics; when each of the gueſts goes home in a chair preceded by ſeveral ſervants, who carry large lanthorns of oiled paper, on which are inſcribed the quality, and ſometimes the name of the maſter. Without ſuch an attendance they would be taken up by the guard; and the day following, they return a card of thanks to the officer.

(11.) CHINESE FESTIVALS. See CHINA, § 27.

(12.) CHINESE, FUNERAL CEREMONIES OF THE. The funeral ceremonies are conſidered by the Chineſe as the moſt important of any. A few moments after a perſon has expired, he is dreſſed out in his richeſt attire, and adorned with every badge of his dignity; after which he is placed in the coffin. The preparation of a coffin, in which his body may be incloſed after death, is one of the chief objects of attention to a Chineſe during his life, and great expenſe is often thrown out upon it; inſomuch that the poor will give all they are worth, and the rich expend 1000 crowns, nay, a ſon will ſell himſelf for a ſlave, to purchaſe a coffin for his father. Sometimes the coffin, when purchaſed with all this labour and expenſe, will remain 20 years uſeleſs in the family; but it is conſidered as the moſt valuable piece of furniture in his poſſeſſion. The manner of interment is as follows: Firſt they ſprinkle ſome lime in the bottom of the coffin; then they lay the body in it, taking care to place the head on a pillow, and to add a great deal of cotton that it may remain ſteady. The body remains thus expoſed 7 days; but the time may be reduced to 3, if any weighty reaſon makes it neceſſary; and, during this interval, all the relations and friends, who are purpoſely invited, come and pay their reſpects to the deceaſed, the neareſt relations remaining in the houſe. The coffin is expoſed in the hall of ceremony, which is then hung with white, but ſome pieces of black or violet coloured ſilk are here and there interſperſed, as well as ſome other ornaments of mourning. Before the coffin is placed a table, on which ſtands the image of the deceaſed, or a carved ornament inſcribed with his name; and theſe are always accompanied with flowers, perfumes, and lighted wax candles. In the mean time thoſe who enter the hall ſalute the deceaſed as if ſtill in life. They proſtrate themſelves before the table, and knock their foreheads ſeveral times againſt the earth; after which they place on the table ſome perfumes and wax candles. Their ſalutations are returned by the eldeſt ſon accompanied by his brothers. The latter come forth from behind a curtain, which hangs on one ſide of the coffin, creeping along the ground until they reach the ſpot where thoſe ſtand whom they are going to ſalute; after which, they return without riſing up. The women are alſo concealed behind the ſame curtain, from whence they every now and then ſend forth diſmal cries. The funeral proceſſion at laſt commences. A troop of men march in a file, carrying different figures made of paſteboard, and repreſenting ſlaves, lions, tigers, horſes, &c. Others follow, marching in two files; ſome of whom carry ſtandards, ſome flags, or cenſers filled with perfumes; while melancholy and plaintive airs are played by others on muſical inſtruments. Theſe muſicians immediately precede the coffin, which is covered with a canopy, in form of a dome, of violet-coloured ſilk: its four corners are ornamented with tufts of white ſilk, neatly embroidered, and covered at the top with net-work. The coffin is placed on the bottom of this machine, and is carried by 64 men. The eldeſt ſon, clothed in a frock of canvas, having his body bent and leaning on a ſtaff, follows near the coffin: and behind him his brothers and nephews, but none of them clothed in canvas. Then comes the relations and friends all clad in mourning, and followed by a great number of chairs covered with white ſtuff, containing the wives and female ſlaves of the deceaſed. Theſe make great ſhow of ſorrow by doleful, yet methodical cries. When they arrive at the burying place, the coffin is depoſited in a tomb appropriated for it, not far from which there are tables arranged in different halls, on which the aſſiſtants are entertained with great ſplendor. The entertainment is ſometimes followed by freſh marks of homage to the corpſe; but theſe are often changed into thanks to the eldeſt ſon; who, however, anſwers only by ſigns. But if the deceaſed was a grandee of the empire, a certain number of his relations do not leave the tomb for a month or two; but reſide in apartments provided for them, and every day renew their marks of grief, with the children of the deceaſed. The magnificence of theſe funeral ceremonies is proportioned to the wealth or dignity of the deceaſed. That of one of the brothers of the emperor was attended by 16,000 people, each of whom had a particular office aſſigned him relating to the ceremony. Mourning continues in China for 3 years; during all which time they muſt abſtain from fleſh and wine: nor can they aſſiſt at any entertainment, or attend any public aſſembly. At firſt they are not even permitted to go abroad; and when they do ſo, they are carried in a chair covered with a white cloth. Sometimes the filial piety of the Chineſe is carried to ſuch a length, that they preſerve the bodies of their fathers in their houſes for 3 or 4 years; and impoſe upon themſelves a great number of other duties, uſing no other ſeat during the day but a ſtool covered with white ſerge, and no other bed but a plain mat made of reeds, which is placed near the coffin. See CHINA, § 16.

(13.) CHINESE GAZETTE. Like the capital cities of European kingdoms, Peking, the metropolis of China, is furniſhed with a gazette, which circulates into the remoteſt provinces, and which is even conſidered by adminiſtration as an eſſential part of the political conſtitution. It is printed daily at Peking, and contains an account of all thoſe objects to which the attention of adminiſtration is directed. In this gazette may be ſeen the names of all thoſe mandarins who are ſtripped of their employments, and the cauſes of their diſgrace; the names of all thoſe delinquents who are puniſhed with death; of the officers appointed to fill the places of the diſgraced mandarins; the calamities which have afflicted any of the provinces; the relief given by government; and the expenſes incurred by adminiſtration for the ſubſiſtence of the troops, ſupplying the wants of the people, repairing or erecting public works; and, laſtly, the remonſtrances made to the ſovereign by the ſuperior tribunals, either with regard to his public deciſions or private conduct. Nothing, however, is contained in this gazette, that has not immediately come from the emperor, or been ſubmitted to his inſpection; and immediate death would be the conſequence of inſerting a falſehood.

(14.) CHINESE, GENIUS OF THE. The genius of the Chineſe is peculiar to themſelves: they have no conception of what European's account beautiful in writing, regular in architecture, or natural in painting; and yet in their gardening, and planning their grounds, they hit upon the true ſublime and beautiful. They perform all the operations of arithmetic with prodigious quickneſs. Before the people of Europe came among them, they were ignorant of mathematical learning, and all its depending arts. They had no proper apparatus for aſtronomical obſervations; and metaphyſical learning was only known to their philoſophers.

(15.) CHINESE INK. Chineſe ink came originally from Corea; and it was not until A. D. 900, that they hit upon the method of making it to perfection. The beſt is made in *Hoei-tcheou*, in the province of *Kiangnan;* but its compoſition is a ſecret, which the workmen conceal not only from ſtrangers, but from their fellow citizens. When a Chineſe has occaſion to write, he places upon his table a piece of poliſhed marble, having a cavity at one end of its extremities to contain a little water. In this he dips the end of his cake of ink, and rubs it upon the ſmooth part of the marble; and as he preſſes more or leſs ſtrongly, the liquor acquires a deeper or lighter tinge of black. When he has done writing, the ſtone is carefully waſhed; for it would be diſhonoured by allowing the leaſt ſpot to remain. The pencils uſed in writing are commonly made of the fur of a rabbit, and conſequently very ſoft.

(16.) CHINESE LANGUAGE. The language of the Chineſe is not only very ancient, but, in M. Groſier's opinion, is ſtill ſpoken as in the moſt early ages without variation. His reaſons for this opinion are, 1. We do not perceive in hiſtory, nor even in the moſt fabulous traditions, a ſingle fact tending to occaſion any doubt of the language ſpoken by the ancient Chineſe being different from that uſed at preſent. 2. China has never changed its inhabitants; and if revolutions have occaſioned any mixture of new languages, it appears that the ancient language has always been predominant, and that the new ſettlers have learned and ſpoken it, as the Tartars after their conqueſt. 3. The moſt intelligent of the literati agree, that the firſt chapters of the *Chou-king* were written in the reign of Yao, A. A. C. 2300. In theſe, ſeveral ſpeeches of the firſt emperors are related word for word; and it is not probable that the language of theſe princes was different from that of the hiſtorian. 4. A compliment paid to Yao by one of his ſubjects, with the anſwer of that prince, are ſtill preſerved, as well as two ſongs compoſed under the ſame reign. 5. The moſt ancient inſcriptions in China are all in the language ſpoken throughout the empire at this day. 6. The Chineſe have borrowed nothing from other nations; and their attachment to their own cuſtoms, and to antiquity, is undoubtedly equally unfavourable to innovation, and improvement. The language, ſpoken by the lower ranks, may have undergone ſome changes; but theſe may be accounted trivial, affecting only the pronunciation; which indeed appears to be varied in ſome few inſtances. It is certain, however, that the Chineſe players act theatrical pieces which were written 1000 years ago, and theſe are ſtill underſtood throughout the empire. The language of the Chineſe has no alphabet; all the words which compoſe it conſiſt of one ſyllable only, are very few in number. Theſe always remain the ſame, and continue monoſyllables even when two are joined together. Theſe monoſyllables never form but one ſound. When written by an European, they begin with the letters *ch*, *tch*, *ſ*, *g*, or *j*, *i*, *h*, *l*, *m*, *n*, *g*, *ng*, *p*, *ſ*, *ts*, *v*, *ou*; the final letters being *a*, *e*, *i*, *o*, *oi*, *ou*, *u*, *l*, *n*, *ng*. The middle of Chineſe words conſiſts of vowels and conſonants producing only one ſound, and pronounced always as monoſyllables. The whole primary words of the language are in number only about 330, though ſome dictionaries make them 484. The ſenſe of theſe words, however, is varied by the accents and changes of the voice in pronouncing them almoſt *ad infinitum*. Two principal accents are known in China; the PING, that is *even*, without elevating or depreſſing the voice. This is divided into *tſing*, *clear*, and *tcho*, *obſcure*; or rather *open* and *mute*. The accent *tſe* is ſubdivided into *tchang*, ſharp, *kiu*, grave, and *jou*, re-entering. The tone is *chang* when one raiſes the voice at the end of a word, as when the negative *no* is pronounced with great emphaſis and force; it is *kiu* when one depreſſes the voice with an air of timidity. When the accent is *jou*, the voice is drawn back as it were into the throat; and the aſpiration which takes place on certain words, beginning with the letters *c*, *k*, *p*, *t*, ſtill adds to theſe varieties. By theſe differences in pronunciation the ſignification of the words is totally changed: thus the word *tchu* pronounced by lengthening the *u*, with a clear tone of voice, ſignifies maſter or lord: if it is pronounced in an uniform tone by lengthening the *u*, it ſignifies *hog*: when pronounced lightly, and with rapidity, it ſignifies *kitchen*; and when articulated with a ſtrong voice depreſſed towards the end, it ſignifies *pillar*. By the conjunction and modification of theſe different monoſyllables, a Chineſe can expreſs every thing he has occaſion for; and it may be eaſily ſeen what variety muſt reſult from this art of multiplying words. The Chineſe language therefore has words expreſſive of the ſmalleſt variation of circumſtance, and which cannot be expreſſed in the European language without a circumlocution. Thus, inſtead of the 5 words, *calf*, *bull*, *ox*, *heifer*, *cow*, every time that a cow has a calf ſhe acquires a new name in the language of this empire; and ſtill another when ſhe becomes barren. An ox fed for ſacrifice has a particular name, which is changed when he goes to the altar. Thus a whole dictionary might be compoſed of the words that are employed to expreſs the different parts of the emperor's palace, and thoſe that are in a manner conſecrated to it; others being employed when the palaces of princes or mandarins are ſpoken of. Thus the number of their characters is augmented beyond all bounds, ſo that the greater part of their literati ſpend all their lives in ſtudying them. In the Chineſe language, there are 4 different dialects; viz. i. The KOU-OUEN, or claſſical language. This is not ſpoken at preſent, though it is generally believed to have been the language of the early ages. It is ſo laconic, and the ideas are ſo crowded, that it is very difficult to be underſtood; however, the literati, who can read and underſtand it, are much delighted with it. ii. The OUEN-TCHANG is the language uſed in compoſitions where a noble and elevated ſtyle is requiſite. It is never ſpoken, but certain ſentences and complimentary expreſſions are ſometimes borrowed from it. It approaches near to the laconic brevity and majeſtic ſublimity of the Kou-ouen, and is equally proper for every kind of ſubject, excepting only the ambiguities of metaphyſics, and the formal rugged diction uſed in treating of the abſtract ſciences. iii. The KOUAN-HA is the language of the court, of people in office, and of the literati. It admits of ſynonymous expreſſions to moderate the brevity of monoſyllables; of pronouns and relatives; prepoſitions, adverbs and particles; to ſupply the want of caſes, moods, tenſes, and numbers, which have place in other languages. iv. The HIANG-TAN is a kind of corrupted language, or provincial dialect, ſpoken by the lower claſſes in China; and of which every province, city, and almoſt every village, has its own. Beſides the ſenſe of the words, which is changed in a great variety of places, they are ſo altered by a diverſity of pronunciation as to be almoſt unintelligible.

(17). CHINESE, MANNERS OF THE. The manners of the Chineſe bear little reſemblance to thoſe of any other nation; and, their hiſtorians ſay, they are the ſame now that they were 4000 years ago. The women are condemned to almoſt perpetual impriſonment within the precincts of their own houſes. A woman is never ſeen, not even by her intended huſband, before marriage.

He knows nothing of her looks or perſon, but from the account of ſome female relation or confident, who in theſe caſes acts the part of match-maker; though, when impoſed upon, either with regard to her age or figure, he can have recourſe to a divorce. The ſame matrons who negociate the marriage, alſo determine the ſum which the intended huſband muſt pay to the parents of the bride: for in China a father does not give a dowry to his daughter; it is the huſband who gives a dowry to the wife. When the day appointed arrives, the bride is placed in a palanquin, the key of which is committed to the care of a truſty domeſtic, who muſt deliver it to none but the huſband. The latter, richly dreſſed, waits at his gates for the arrival of the proceſſion. As ſoon as it approaches, the key is put into his hands; he eagerly opens the chair, and for the firſt time perceives his good or bad fortune. If he is contented with his new ſpouſe, the bride deſcends and enters the houſe, where the marriage is celebrated by feaſting and merriment as in other countries; but if the bridegroom is very much diſappointed, he ſuddenly ſhuts the chair, and ſends the bride home to her relations. To get rid of her in this manner, however, coſts a ſum equal to what he originally gave in dowry to obtain her. The Chineſe women, even of the firſt rank, ſeldom quit their apartment, which is ſituated in the moſt retired part of the houſe, and in which they are ſecluded from all ſociety but that of their domeſtics. The book of ceremonies requires that there ſhould be two apartments in every houſe; the exterior one for the huſband, the interior for the wife. They muſt even be ſeparated by a partition, the door of which is carefully guarded; nor is the huſband at liberty to enter the wife's apartment, or ſhe to quit it, without ſufficient reaſon. A widow of ſuperior rank, who has children, ſeldom enters a 2d time into the marriage ſtate, though thoſe of the ordinary rank generally do. Poor widows are not at liberty to follow their inclinations, but are ſold for the behoof of the parents of the deceaſed. As ſoon as the bargain is concluded, a couple of porters bring a chair, which is guarded by a number of truſty people. In this the widow is ſhut up, and thus conducted to her new huſband. Concubinage is tolerated in China, though not authoriſed by law. This privilege is granted only to the emperor, the princes of the blood, and mandarins; and none but the emperor is permitted to have more than one. But the people generally avail themſelves of the toleration, and have 2 or 3 concubines if they can afford to pay the cuſtomary ſum to the parents, &c. They, however, excuſe themſelves as well as they can to their wives in this reſpect, pretending only a deſire of having many children, and a number of women to attend their wives; for the concubines and their children muſt all be ſubject to the lawful wife. Others, deſirous of having a male child, which perhaps their lawful wife cannot have, take a concubine for this reaſon only, and diſmiſs her as ſoon as their wiſhes are accompliſhed: they then permit her to marry whom ſhe pleaſes, and frequently even provide a huſband for her themſelves. Theſe concubines are almoſt all procured from two cities, named YANG-TCHEOU and SOU-TCHEOU, where they are educated, and taught ſinging, dancing, muſic, and every accompliſhment ſuitable to women of quality, or which can render them agreeable and pleaſing. The greater part of them are purchaſed in other places, to be again diſpoſed of; and this is the principal branch of trade carried on by theſe two cities. Unlawful intrigues are ſeldom heard of in China.

(18.) **CHINESE, MARRIAGE LAWS AMONG THE.** The Chineſe are allowed only to have one wife, whoſe rank and age muſt be nearly equal to that of her huſband. A perſon who has once been married, whether man or woman, may lawfully marry again, but it is then not neceſſary to ſtudy equality of age or condition. A man may chooſe his ſecond wife from among his concubines; (§ 17,) and, in all caſes, the ſecond marriage requires very few formalities. A widow is abſolute miſtreſs of herſelf, and can neither be compelled by her parents to marry again, nor to continue in a ſtate of widowhood, contrary to her own inclination. A widow, of moderate rank, however, who has no children, does not enjoy this privilege; as the parents of the former huſband can diſpoſe of her in marriage, not only without her conſent, but without her knowledge. The law authoriſes this, to indemnify the relations of the deceaſed huſband, for the money they may have coſt him. If the wife is left big with child, this cannot take place, until ſhe is delivered; nor can it be done at all, if ſhe brings forth a ſon. There are other two exceptions; 1. When the parents of the widow aſſign her a proper maintenance; and, 2. If the widow embraces a religious life, and becomes a bonzeſſe. Divorces are allowed in China in caſes of adultery, mutual diſlike, incompatibility of tempers, jealouſy, or even *loquacity* on the part of the wife. But ſhe cannot be divorced if ſhe has loſt her parents after marriage, or has worn mourning 3 years for her father, mother, or a former huſband. No huſband can put away or ſell his wife, until a divorce is legally obtained; and if this regulation be not ſtrictly obſerved, the buyer and ſeller become equally culpable. If a wife, lawfully married, privately withdraws herſelf from her huſband, he may immediately commence an action at law; by the ſentence of which ſhe becomes his ſlave, and he may ſell her to whom he pleaſes. But if a huſband leaves his wife for 3 years, ſhe is at liberty, after laying her caſe before the mandarins, to take another huſband; but if ſhe were to anticipate their conſent, ſhe would be liable to a ſevere puniſhment. Marriage is deemed illegal in China in the following caſes. 1. If a young woman has been betrothed to a young man, and preſents have been given and received by the parents of the intended huſband and wife. 2. If inſtead of a beautiful young woman another be ſubſtituted of a diſagreeable figure; or if the daughter of a free man marry his ſlave; or if any one give his ſlave to a free woman, pretending to her parents that he is his ſon, or relation. In all theſe caſes the marriage is null and void; and thoſe who have had any ſhare in the making up the match are ſeverely puniſhed. 3. A mandarin of letters is forbidden to form an alliance with any family reſiding in the province or city of which he is governor.

tenor. 4. No Chineſe youth can enter into a ſtate of marriage during the time of mourning for his father or mother. If promiſes have been made before, they ceaſe on that event taking place. But after the uſual time of mourning is expired, the parents of the intended bride muſt write to the parents of the young man, putting him in mind of his engagement. 5. Marriage is alſo ſuſpended when a family experiences any ſevere misfortune, and even if a near relation were thrown into priſon; though this may be ſet aſide, provided the unfortunate perſon give his conſent. 6. Two brothers cannot marry two ſiſters; nor is a widower at liberty to marry his ſon to the daughter of a widow whom he chooſes for his own wife. A man is alſo forbidden to marry any of his own relations, however diſtant the degree of conſanguinity may be.

(19.) CHINESE, MEDICAL KNOWLEDGE OF THE. Moſt of the Chineſe medicine is abſolute quackery. Their ſkill in anatomy is not only very limited, but mixed with ſuch a number of falſehoods, as render it in a manner abſolutely uſeleſs. Their materia medica conſiſts moſtly of herbs, of which tea is one. To this they aſcribe great and wonderful virtues, eſpecially if it has been gathered on any of the ſummits of a mountain called MONG-CHAN.

(20.) CHINESE MUSIC. With regard to the muſic of the Chineſe, the ſame ſtories are related as of the Greeks and Egyptians, viz. that in former ages the muſicians could make brute animals leap at the ſound of their inſtruments. The ancient Chineſe, it is ſaid, were acquainted with the diviſion of the octave into 12 ſemitones; and that before the time of Pythagoras, or even Mercury himſelf: that the lyre of Pythagoras, his invention of diatonic tetrachords, and the formation of his grand ſyſtem, were merely borrowed from the ancient Chineſe. In ſhort, it is maintained, that the Greeks, even Pythagoras himſelf, did nothing but apply to ſtrings that theory which the Chineſe had before formed, and applied to pipes. The Chineſe are not acquainted with the uſe of our muſical notes; they have not that diverſity of ſigns which diſtinguiſh the different tones, and the gradual elevation or depreſſion of the voice, nor any thing to point out the various modifications of ſound to produce harmony. They have only a few characters to mark the principal notes; and all the airs they learn are repeated merely by rote. The emperor Cang-hi was therefore greatly aſtoniſhed at the facility with which an European could catch and remember an air the firſt time he heard it. In 1679 he ſent for Fathers Grimaldi and Pereira, to play ſome tunes on the harpſichord, of which they had before made him a preſent. He was greatly entertained with their muſic, but altogether aſtoniſhed when he found that F. Pereira could take down a Chineſe air, while the muſicians were playing it, and then repeat the whole without omitting a ſingle note.

(21.) CHINESE MUSICAL INSTRUMENTS. The Chineſe have always diſtinguiſhed eight different ſounds; and they believe that nature, in order to produce theſe, formed 8 different kinds of ſonorous bodies. The order in which they diſtribute theſe ſounds, and the inſtruments they have contrived to produce them, are, 1. The ſound of ſkin produced by drums. 2. That of ſtone produced by the *king*. 3. The ſound of metal by bells. 4. That of baked earth by the *huien*. 5. Of ſilk by the *kin* and *che*. 6. Of wood by the *yu*, and *tchou*. 7. Of the bamboo by the *koan*, and different flutes. 8. That of a gourd by the *cheng*. The drums were originally compoſed of a box made of baked earth, and covered at the extremities with the ſkin of ſome animal; but on account of the brittleneſs of baked earth, wood was ſoon ſubſtituted in its ſtead. Great part of theſe inſtruments are ſhaped like our barrels, but ſome are cylindric. The inſtruments formed of the ſonorous ſtones are called KING, diſtinguiſhed into *tſe-king* and *pien-king*. The TSE-KING conſiſts only of one ſtone, and therefore produces only one note. The PIEN-KING conſiſts of 16 ſtones ſuſpended together, and thus forming an inſtrument capable of producing all the tones admitted into the muſic of the ancient Chineſe. They are cut into the form of a carpenter's ſquare; their tone is flattened by diminiſhing their thickneſs, and is made ſharper by abridging their length. The bells in China have always been made of a mixture of tin and copper. They are of different ſhapes, and thoſe of the ancients were not round, but flatted, and in the lower part reſembling a creſcent. An inſtrument correſponding to the *king* already mentioned, is compoſed of 16 bells of different ſizes. Some of their bells uſed on public occaſions are of enormous magnitudes. One at Peking is deſcribed as 13½ feet in diameter, 12½ in height, and 42 in circumference; the weight being upwards of 120,000 lb. It is uſed for announcing the watches of the night; and its ſound, which is prodigiouſly loud and ſtrong, has a moſt awful effect, by reverberating the echo of the ſurrounding country. There are ſeveral others likewiſe of vaſt ſize in the ſame city; one of which is greatly admired for the beautiful characters with which it is covered; and which are as neat and perfect as if traced out by the hand of the fineſt writer, or formed by a ſeal upon wax. F. le Comte tells, that in all the cities of China there are bells for making the hours and watches of the night. They generally divide the night into 5 watches, beginning at 7 or 8 in the evening. On the commencement of the firſt they give one ſtroke, which is repeated a moment after; and thus they continue for two hours till the beginning of the ſecond: they then give two ſtrokes, which are repeated at equal intervals till the beginning of the 3d watch; and thus they proceed to the 4th and 5th, always increaſing the number of the ſtrokes. For the ſame purpoſe alſo they uſe enormous drums, which they beat in a ſimilar manner. F. Magaillans mentions one at Peking upwards of 40 feet in circumference. The inſtrument called HUIEN, which is made of baked earth, is highly eſteemed by the Chineſe on account of its antiquity. It is diſtinguiſhed into two kinds. the great and ſmall; the former being of the ſize of a gooſe's egg; the latter of that of a hen's. It has ſix holes for the notes, and a ſeventh for the mouth. The KIN and TCHE have been known from the remoteſt antiquity. The kin has ſeven ſtrings made of ſilk, and is diſtinguiſhed into three kinds, differing only in ſize. The body is formed of a kind of wood varniſhed black, and its whole length about 5 feet 5 inches. The *tche* is about 9 feet in length, has 25 ſtrings, and is divided into 25 kinds. F. Amiot aſſures us, that we have no inſtrument in Europe which deſerves to be preferred to it. The inſtruments which emit the ſound of wood are the TCHOU, the YU, and the *tchoung-tou*. The firſt is ſhaped like a buſhel, and is beat on the inſide with a hammer; the ſecond, which repreſents a tiger ſquatting, is made to ſound by ſcraping its back gently with a rod; the third is a collection of 12 pieces of boards tied together, which are uſed for beating time, by holding them in the right hand, and knocking them gently againſt the palm of the left. Many inſtruments are conſtructed of the bamboo. Theſe conſiſt of pipes joined together, or ſeparate, and pierced with more or fewer holes. The principal of all theſe wind inſtruments is the *cheng*, which emits the ſound of a gourd. This is formed by cutting off the neck of a gourd, and reſerving only the lower part. To this a cover is fitted, having as many holes as are equal to the number of ſounds required. In each of theſe holes a pipe made of bamboo is fixed, and it is ſhorter or longer according to the tone intended. The mouth of the inſtrument is formed of another pipe ſhaped like the neck of a gooſe; which is fixed to the gourd on one ſide, and ſerves to convey the air to all the pipes it contains. The ancient *cheng* varied in the number of their pipes; thoſe uſed at preſent have only 13.

(22.) CHINESE PAINTING, ENGRAVING, &c. The painting of the Chineſe is undoubtedly inferior to that of the Europeans, though we are not to judge of the abilities of the painters of this empire by the performances brought to Europe. M. Groſier remarks, that the works of the eminent Chineſe painters are never brought to Canton, becauſe they cannot find purchaſers among the European merchants. It ſeems, however, to be univerſally agreed, that the Chineſe have no notion of correctneſs or perſpective, and little knowledge of the proportions of the human body, though it cannot be denied that they excel in painting flowers and animals. In theſe they pride themſelves in a ſcrupulouſly exact imitation of nature; inſomuch that it is no uncommon thing to hear a painter aſk his pupil how many ſcales there are between the head and tail of a carp. Painting was formerly much eſteemed in China, but has now fallen into diſrepute on account of its political inutility. The cabinets and galleries of the emperor, however, are filled with European paintings, and the celebrated artiſts Caſtiglioni and Attiret were both employed; but their offer of erecting a ſchool of painting was rejected, leſt they ſhould revive the taſte, which it had been formerly thought prudent to ſuppreſs. Painting in freſco was known in China long before the Chriſtian æra; and, like the Grecians, the Chineſe boaſt much of their celebrated painters of antiquity. The remaining part of the wall repreſents a land-ſcape and little hills, which are ſo happily blended with the diſtant mountains, that nothing can be conceived more agreeable. This was the production of Chineſe painters. Engraving in 3, 4, or 5 colours, is very ancient among the Chineſe, and was known in this empire long before its diſcovery in Europe. Sculpture is very little known in this empire; nor is there a ſingle ſtatue in any of the ſquares or public edifices of Peking, not even in the emperor's palace. The only real ſtatues to be met with in the empire are thoſe which, for the ſake of ceremonious diſtinction, are uſed to ornament the avenues leading to the tombs of princes and men of great rank; or thoſe that are placed near the emperor's coffin, and that of his ſons and daughters in the interior part of the vault, where their remains are depoſited.

(23.) CHINESE PAPER. The art of making paper has been long known among the Chineſe. That kind of paper now in uſe was firſt manufactured about A. A. C. 105. Before that period they uſed cloth, and various kinds of ſilk ſtuff, inſtead of paper; and they ſtill preſerve a cuſtom of writing the praiſes of the dead upon large pieces of ſilk, which are ſuſpended on one ſide of the coffin, and carried in funeral proceſſions; and of ornamenting their apartments with moral ſentences written in the ſame manner. In ages ſtill more early, they wrote with a kind of ſtyle upon pieces of bamboo, or plates of metal. The firſt paper was invented by a mandarin. He took the bark of trees, hemp, and old pieces of ſilk ſtuff, boiling them together until they were reduced to a kind of paſte, of which he formed his paper; which by degrees was brought to perfection, and the art of whitening and giving it a luſtre found out. Many different ſubſtances are now uſed for making paper; ſuch as the bamboo reed, the cotton ſhrub, the bark of the plant *kou-chou*, and of the mulberry tree; hemp, the ſtraw of wheat and rice, parchment, the cods of the ſilk worm, and ſeveral other ſubſtances unknown in Europe. In this manufacture the bark of trees and ſhrubs is uſed, and the woody ſubſtance of the bamboo and cotton tree, after it has been macerated and reduced to a thin paſte. Moſt of the Chineſe paper, however, is attended with the diſadvantages, that it is very ſuſceptible of moiſture, readily attracts the duſt, and worms inſenſibly get into it; to prevent which inconveniences, it is neceſſary to beat the books often, and expoſe them to the ſun. That made of cotton is pretti eſt, and moſt uſed. All of them, however, are much ſofter and ſmoother than ours; which is abſolutely neceſſary for their method of writing with a pencil, that it may run with freedom, which it could not do upon ours. It is formed into ſheets of an enormous ſize; ſome of them 30 or 40 feet long.

(24.) CHINESE POETRY. Poetry is ſeldom an object of attention, though the taſte for it ſeems to be pretty general in China. Their verſification has its rules, and is as difficult as that of other nations. Only the moſt harmonious, energetic, and pictureſque words, are employed, and they muſt always be uſed in the ſame ſenſe in which they were uſed by the ancients. Each verſe can contain only a certain number of words; which muſt be ranged by the rules of quantity, and terminate in rhyme. The number of verſes in a ſtrophe is not determined; but they muſt be uniform, and preſent the ſame diſtribution of rhymes. The ſmall number of poetical expreſſions contained in the Chineſe language has rendered it neceſſary to extend the poetical licence to a great length in this reſpect. The Chineſe poets are allowed to employ a blank verſe in every four. They are acquainted with moſt kinds of poetry in uſe among us. They have ſtanzas, odes, elegies, idylls, eclogues, epigrams, ſatires, and even *bouts rimes*.

(25.) Chineſe printing. The Chineſe method of printing is exceedingly different from ours; and indeed it would be impoſſible to have moveable types for ſuch a number of characters as their language requires. The whole work, which they intend to print, is therefore engraved upon blocks of wood; and their method of proceeding is as follows. They firſt employ an excellent writer, who tranſcribes the whole upon very thin paper. The engraver glues each of the leaves of the M. S. upon a piece of plank made of any hard wood: he then traces over with a graver the ſtrokes of the writing, carves out the characters in relief, and cuts down the intermediate part of the wood. Thus each page of a book requires a ſeparate plank; and the exceſſive multiplication of theſe is no doubt a very great inconvenience, one chamber being ſcarce ſufficient to preſerve thoſe employed for a ſingle book. But the advantages are, that the work is thus free from typographical errors, and the author has no occaſion to correct the proofs. Thus alſo the bookſellers in China have a decided advantage over thoſe of Europe, as they are able by this method of printing to throw off copies according to their ſale, without running the riſk of being ruined by too large an edition. In this method the beauty of the work depends entirely upon the ſkill of the writer previouſly employed. The engravers are exceedingly dexterous, and imitate every ſtroke ſo exactly, that it is ſometimes difficult to diſtinguiſh a printed work from one that is only written. The method of printing in China is not by a preſs as in Europe, as neither their wooden planks nor their ſoft paper could ſuſtain ſo much preſſure. They firſt place the plank level, and then fix it in that poſition. The printer is provided with 2 bruſhes, and, with the hardeſt, daubs the plank with ink; and one daubing is ſufficient for 4 or 5 leaves. After a leaf has been adjuſted upon the plank, the workman takes the 2d bruſh, which is ſofter than the former, and of an oblong figure, and draws it gently over the paper, preſſing it down a little, that it may receive the ink. The degree of preſſure is regulated by the quantity of ink upon the plank: and thus one man is able to throw off almoſt 10,000 copies a-day! The ink uſed for printing is different from that uſed in writing. (See § 15.) The leaves, on account of the thinneſs of the paper, are printed only upon one ſide; on which account each leaf of a book is double, ſo that the fold ſtands uppermoſt, and the opening is towards the back, where it is ſtitched. Hence the Chineſe books are not cut on the edges, but on the back. They are generally bound in grey paſteboard, which is very neat; and thoſe who wiſh to have them more elegantly done, get the paſteboard covered with ſatin, flowered taffety, or gold and ſilver brocade.

(26.) Chineſe, religion of the. F. Amiot informs us, that after making every poſſible reſearch, reſpecting the ancient religion of the Chineſe, he at laſt concluded, that "they are a diſtinct people, who have ſtill preſerved the characteriſtic marks of their firſt origin; a people whoſe primitive doctrine will be found, by thoſe who take the trouble of inveſtigating it, to agree in its eſſential parts with the doctrine of the choſen people, before Moſes, by the command of God himſelf, had conſigned the explanation of it to the ſacred records; a people in a word, whoſe traditional knowledge, when freed from whatever the ſuperſtition of latter ages has added to it, may be traced back 4000 years, to the renewal of the human race by the grandſons of Noah." The King, or canonical books of the Chineſe, every where inculcate the belief of a Supreme Being, the author and preſerver of all things. Under him they mention the names of *Tien*, or Heaven; *Chang-tien*, or Supreme Heaven; *Chang-ti*, or Supreme Lord; and of *Hoang-chan-ti*, Sovereign and Supreme Lord: "Names (ſays M. Groſier) correſponding to thoſe which we uſe when we ſpeak of God, the Lord, the Almighty, the Moſt High." According to the Chineſe books, the Supreme Being is the principle of every thing that exiſts, and the father of all living; he is eternal, immoveable, and independent; his power knows no bounds; he equally comprehends the paſt, preſent, and future, penetrating into the inmoſt receſſes of the heart. Heaven and earth are under his government; all events, all revolutions, are the conſequences of his will; he is pure, holy, and impartial; wickedneſs offends his ſight; but he beholds with an eye of complacency the virtuous actions of men. Severe, yet juſt, he puniſhes vice in a ſtriking manner even on the throne, and often precipitates from thence the guilty, to place upon it the man who walks after his own heart, whom he raiſeth from obſcurity. Good, merciful, and full of pity, he relents on the repentance of the wicked: public calamities, and the irregularities of the ſeaſons, are only ſalutary warnings, which his fatherly goodneſs gives to men to induce them to reform and amend. The performance of religious worſhip at the appointed times, has given occaſion to the great exactneſs with reſpect to the kalendar, which is remarkable throughout China: and all the celebrated emperors have begun their reigns with a reformation of it. Our hiſtorians, have alſo diſcovered in the Chineſe religion evident ſymptoms of a knowledge of the Trinity. "Among the ancient Chineſe characters (ſays M. Groſier,) which have eſcaped the ravages of time, we find the following △. According to the dictionary of *Kang-hi*, this ſignifies union; according to the *Cheo-ouen*. (that book ſo highly eſteemed in China, △ is three united in one; it derives it from the characters *jou*, (to enter or penetrate.) and *ye*, one; whence it concludes, that △ means three, united, penetrated, or incorporated into one. According to another book, accounted a learned and accurate explanation of the ancient characters, '△ ſignifies ſtrict union, harmony, the chief good of man, of heaven, and of earth; it is the union of the three *tſai*, (powers, principles, or intelligences;) for, united, they direct, create, and nouriſh together. The image $\frac{\overline{\text{I}}}{\underline{\text{I}}}$ (three united in one figure) is not ſo obſcure in itſelf; however it is difficult to reaſon upon it without being deceived: on this ſubject it is difficult to ſpeak.' Father Amiot conjectures, that the character △ might have been among the ancient Chineſe, the ſymbol of the moſt holy Trinity; and the more ſo, (he adds) as the ancient books furniſh a number of texts, which give us reaſon to ſuppoſe them to have been poſſeſſed of ſome knowledge of this ſublime myſtery.' The book *See-ki* ſays, ' The emperor formerly offered up a ſolemn ſacrifice every three years to the Spirit Trinity and Unity, CHIN-SAN-YE.' The following celebrated text of LAO-TSE has long been known in Europe. ' TAO is one by nature; the firſt begot the ſecond; two produced the third; the three created all things.' F. Amiot quotes another paſſage, which appears to be no leſs ſingular. ' He who is, as it were, viſible, and cannot be ſeen, is named KHI; he who may be heard, yet ſpeaketh not to the ears, is called HI; he whom, in a manner, we feel, yet cannot touch, is named OUEI. In vain do we interrogate our ſenſes reſpecting theſe three; our reaſon, which alone can give us any ſatisfaction, will tell us that they make only one. Above there is no light; below there is no darkneſs. He is eternal; there is no name which can be given him. He reſembles nothing that exiſts; he is an image without figure; a figure without matter: his light is ſurrounded by darkneſs. If we look up to him above, we behold no beginning; if we follow him, we diſcover no end. From what the TAO hath been at all times, we conclude what he is, viz. that he is eternal: he is the beginning of wiſdom.' The commentaries which explain this paſſage ſpeak in ſuch ſtrong and preciſe terms, that F. Amiot forbears to quote them, leſt he might incur the cenſure of too many incredulous readers."

(27.) CHINESE, RELIGIOUS SECTS AMONG THE. The purity of the ancient Chineſe religion has been long contaminated by many idolatrous and fanatical ſects. That of TAO-SSE was founded by a philoſopher called LAO-KIUN. His morality conſiſts principally in baniſhing all vehement deſires and paſſions. According to him, the care of every wiſe man ought to be only to endeavour to live free from grief and pain, and to glide gently down the ſtream of life devoid of care and anxiety. To arrive at this happy ſtate, he adviſes his followers to baniſh all thoughts of the paſt, and all anxiety for the future, ariſing from ambition, avarice, &c. His diſciples, however, found that all their endeavours to obtain a perfect tranquillity of mind were vain, as long as the thoughts of death intervened; they therefore declared it poſſible to diſcover a compoſition from which drink might be made, that would render mankind immortal. Hence they were led to the ſtudy of chemiſtry; and, like the weſtern alchemiſts, wearied themſelves in ſearch of the philoſopher's ſtone, until at laſt they gave themſelves up to all the extravagancies of magic. The deſire of avoiding death, together with the credulity natural to unenlightened minds, quickly produced a number of converts to the ſect of TAO-SSE. Magical practices, the invocation of ſpirits, and the art of foretelling events by divination, were quickly diffuſed over the empire, and the imbecility of the emperors contributed to propagate the folly. Temples conſecrated to ſpirits were quickly reared, and two of the moſt celebrated of the ſect were authoriſed to maintain public worſhip, after the form which had been preſcribed by their maſter. At the ſame time they made, and ſold at a high price, images of thoſe ideal ſpirits, with which they had peopled the heavens and the earth. Theſe were worſhipped as ſo many deities independent of the Supreme Being; and, in like manner, ſeveral of the ancient emperors were invoked as gods. Being patroniſed by the emperors of ſeveral dynaſties, this ſect became more and more powerful. At laſt they had the impudence to affix during the night, to one of the gates of the imperial city, a book filled with myſtic characters and magical figures. At day-break they informed the emperor of the ſudden appearance of this book, and publicly declared that it was fallen from heaven. This trick eaſily impoſed upon the weak prince. He immediately repaired, with a numerous train, to the ſpot where the ſacred volume appeared; and having taken it into his hands in a reſpectful manner, carried it in triumph to his palace, where he ſhut it up in a golden box. Another emperor carried his reverence for the ſect to ſuch an height of impiety, as to order a celebrated *Tao-ſſe* to be publicly worſhipped, under the name of *Chang-ti*. The ſect, thus patroniſed by the princes, continued to gain ground, in ſpite of every oppoſition from the wiſer part of the people, and is ſtill very powerful in China. At preſent they offer up a hog, a fowl, and a fiſh, to a ſpirit whom they invoke. Various ceremonies, ſuch as howling, drawing fantaſtical figures upon paper, making a hideous noiſe with kettles and drums, &c. are uſed in their incantations; and though for the moſt part unſucceſsful, yet their credit is ſtill kept up by thoſe caſes in which they ſucceed by accident. The chief Tao-ſſe is inveſted with the dignity of grand mandarin; he reſides in a ſumptuous palace in a town of Kiang-ſi; and the ſuperſtitious confidence of the people attracts an immenſe number thither from all parts of the empire. Some come to be cured of diſeaſes; others to get an inſight into futurity. The impoſtor diſtributes to them ſmall bits of paper filled with magical characters; and the ignorant wretches depart well ſatisfied, without grudging the expenſe of their journey, though ever ſo long. A ſtill more pernicious and more widely diffuſed ſect is that of the idol Fo, which came originally from India. The Tao-ſſe had promiſed to the brother of one of the emperors of China to introduce him to a communication with ſpirits. The credulous prince having heard of a great ſpirit named Fo who reſided in India, prevailed on his brother to ſend an embaſſy thither. On the arrival of the ambaſſadors, however, they could find only two worſhippers of this deity, both of whom they brought to China. Several images of Fo were alſo collected at the ſame time; and theſe, together with ſome canonical books of the Indians, were placed on a white horſe, and carried in proceſſion to the imperial city. This ſuperſtition was introduced into China about A. D. 65, and ſoon made vaſt progreſs. One of its principal doctrines is that of the metempſychoſis, or tranſmigration of ſouls, of which M. Groſier thinks he was the inventor, and that Pythagoras, who travelled into ſeveral parts of India, had borrowed the doctrine from him. The account given of him by the bonzes is, that finding himſelf, at the age of 70, oppreſſed with infirmities, he called his diſciples together, and told them he was unwilling to leave the world without communicating the ſecret and hidden myſteries of his doctrine; which were, in ſhort, that all things had proceeded from nothing, and to that they muſt return. This doctrine produced a correſponding mode of action, or rather of inaction, in thoſe who believed it. The common doctrine, however, which admits of diſtinction between good and evil, finds more proſelytes among thoſe, whoſe ſituation in life will not allow them to ſpend their time in idleneſs. They ſay that the god Fo came to ſave mankind, and to expiate their ſins; and that he alone can procure them a happy regeneration in the life to come. Five precepts are inculcated on thoſe who adopt this doctrine: 1. Not to kill any living creature; 2. Not to take away the goods of another: 3. Not to pollute themſelves by uncleanneſs: 4. Not to lie; and, 5. Not to drink wine. Above all, they recommend to them to perform acts of mercy, to treat their bonzes well, build temples, &c. The doctrine of the metempſychoſis has introduced into China an infinite number of idols, who are all worſhipped on the ſuppoſition, that the ſpirit of Fo has tranſmigrated into the animals they repreſent. A colony of Jews was eſtabliſhed in China about A. A. C. 206; but they are now reduced to a ſmall number of families at Cai-fong, the capital of Honan. The Mahometans have multiplied much more than the Jews. It is above 600 years ſince they firſt entered the empire, where they have formed different eſtabliſhments. They are now become ſo numerous, that, in the places where they reſide, they exclude all who do not believe in their prophet, and frequent a moſque.

(28.) CHINESE SACRIFICES. The ſacrifices of the Chineſe were firſt offered up in the open fields, or on ſome mountain, upon what they call the TAN, which ſignifies a quantity of ſtones thrown together in a round form, or ſimply a round heap of earth. A double fence, called *Kiao*, compoſed of turf and branches of trees, was raiſed around this; and in the ſpace left between the two fences, two leſſer altars were erected on the right and left; upon which, immediately after the ſacrifice offered up to the TIEN, they ſacrificed alſo to the CHENG, or good ſpirits of every rank, and to their virtuous anceſtors. The ſovereign alone had a right of ſacrificing upon this TAN; and the cuſtom of ſacrificing to inferior ſpirits, according to the Chineſe commentaries, may be traced even to the days of Fo-hi. While the empire was confined within narrow bounds, one mountain was ſufficient for the ſacrifices; but in proceſs of time it became neceſſary to conſecrate 4 others. Theſe were ſituated at the extremities of the empire, and were ſuppoſed to correſpond with the four quarters of the world. The prince went ſucceſſively every year to one of theſe mountains to offer up ſacrifices. This cuſtom continued long; but at length it was found convenient, to add a 5th mountain in the centre of the empire; and ever ſince theſe have been called the five Yo, or the five mountains of ſacrifice. This method of ſubjecting the emperor to regular annual journies was attended with many inconveniences. It was found neceſſary to conſecrate ſome ſpot near his palace, which might be ſubſtituted for the *Yo* upon all occaſions when the emperor could not repair to them. An edifice was therefore erected, which at once repreſented the *Kiao, Tan*, and the *Hall of Anceſtors*. This laſt was a neceſſary part of the edifice; becauſe it was incumbent on thoſe who offered up ſacrifices, firſt to repair to this hall, and acquaint their anceſtors with what they were about to perform; and thither alſo they returned after ſacrificing, to thank the ſame anceſtors for the protection they had received from the Chang-ti; after which they offered up a ſacrifice of thankſgiving in honour of them. The building contained 5 ſeparate halls, appropriated to different purpoſes: originally it had neither paintings nor ornaments of any kind, and a ſtair-caſe of [illegible] ſteps conducted to the principal entrance. Afterwards it was richly ornamented, each of the halls being decorated with columns, over which others were placed that ſupported a ſecond roof. In ſucceeding times it was ſtripped of all its ornaments, with a view to bring back religion to its primitive ſimplicity. Its four gates and the ridge of the roof were covered with fine moſs, repreſenting the branches, of which the double fence of the ancient *Kiao* were formed. The whole was encompaſſed by a canal filled with water at the time of offering up the ſacrifices. To this a 2d building was added, which they called *the temple of* [illegible]*neſs*, and which was uſed only for purifications and ceremonies, the former being entirely conſecrated to the worſhip of the Chang-ti. At preſent there are only two temples in Peking, named the TIEN-TAN and the TI-TAN; in the conſtruction of which all the elegance of Chineſe architecture is diſplayed. Theſe are both dedicated to the Chang-ti, but under different titles; in the one he is adored as the *eternal ſpirit;* in the other, as the *creator* and preſerver of the world. The ceremonies of the modern ſacrifices are greatly multiplied; and nothing can exceed the ſplendour and magnificence with which they are performed. Some time before the day appointed for the grand ceremony, the monarch, the grandees of the court, and all thoſe whom their employments qualify to aſſiſt at the ſolemnity, prepare themſelves by retirement, faſting, and continence; no audience is given by the emperor; the tribunals are ſhut; marriages, funerals, rejoicings, and entertainments are forbidden. On the day appointed, the emperor appears, attended by an innumerable multitude, and ſurrounded by a vaſt number of princes, lords, and officers; while every part of the temple ſeems to correſpond with the magnificence of the ſovereign; all the vaſes and utenſils employed in the ſacrifices are of gold, and cannot be applied to any other purpoſe; even the inſtruments of muſic are of enormous magnitude, and uſed only on that occaſion. All this grandeur, however, ſerves only to diſplay in a more eminent manner the humility and abaſement of the monarch during his devotion; at which time he rolls in the duſt, and ſpeaks of himſelf before the *Chang-ti* in terms of the moſt abject ſubmiſſion and humiliation.

(29.) CHINESE SUPERSTITIONS. A ſpecies of ſuperſtition, which ſeems peculiar to this nation, is named FONG-CHOUI, *i. e.* wind and water. By this they mean the lucky or unlucky ſituation of a houſe, burying-place, &c. If any perſon has built a houſe cloſe to that of a Chineſe, in ſuch a manner that the angle formed by its roof flanks the wall or roof of the former houſe, the proprietor ever after lives in terror of utter ruin and deſtruction from the malignant influence of that angle. "We ſhould never have done (ſays M. Croſier,) were we to relate all the ſuperſtitious ideas of the Chineſe, reſpecting the lucky or unlucky ſituation of houſes, the quarter which doors ought to front, and the plan and day proper for conſtructing the ſtoves in which they cook their rice." But the object on which they employ their greateſt care is the choice of a ſituation for a burying-place. Some quacks follow no other profeſſion, than that of pointing out hills and mountains, which have an aſpect favourable for ſuch works. When a Chineſe is perſuaded of the truth of ſuch information, there is no ſum which he will not give to obtain the fortunate ſpot. The greater part of the Chineſe are of opinion, that all the happineſs and misfortunes of life depend upon the *fong-choui*. The Chineſe have been greatly reproached with the inhuman practice of murdering their children; but though M. Groſier cannot deny that they are guilty of this practice, he excuſes them by ſaying, that "the crime, when committed in China, is commonly owing to the fanaticiſm of idolatry; a fanaticiſm which prevails only among the loweſt of the people. It is either in obedience to the oracle of a bonze, to deliver themſelves from the power of magic ſpells, or to diſcharge a vow, that theſe infatuated wretches throw their children into the river: they imagine that, by doing ſo, they make an expiatory ſacrifice to the ſpirit of the river. All nations of antiquity almoſt have diſgraced themſelves by the like horrid practices; but the Chineſe are far from countenancing this barbarity on that account. Theſe criminal ſacrifices are never practiſed but in certain cantons of China, where the people, blinded by idolatry, are the dupes of fanaticiſm and ſuperſtition.

(30.) CHINESE SWANPAN. See SWANPAN.

(31.) CHINESE, TEA-DRINKING AMONG THE. The Chineſe method of drinking tea is not like that of other nations. A ſmall quantity of bohea, ſufficient to tinge the water and render it palatable, (for they drink no green,) is taken in the morning, and thrown into a veſſel adapted to the number in the family. This ſtands till milk warm; in which ſtate it is kept the whole day, and a cup drunk now and then without ſugar or milk, to exhilarate the ſpirits when exhauſted; and if a ſtranger call by accident, or a viſit, or by appointment, the firſt thing preſented is a ſmall pipe filled with tobacco of their own growth and a cup of the tea, with ſweetmeats, &c. Tea is the daily beverage in China, and is drank by all ranks of people.

(32.) CHINESE WINES. The wines of China have no reſemblance to thoſe of Europe, either in taſte or quality, being moſtly procured from rice and not from the vine. A particular kind of rice is employed for making them, and the grain is ſteeped for 20 or 30 days in water, into which ingredients of a different nature are ſucceſſively thrown: they afterwards boil it; and as ſoon as it diſſolves by the heat, it ferments and throws up a vaporous ſcum, like new wine. A very pure liquor is found under this ſcum, which is drawn off and put into veſſels well glazed: From the remaining lees, an inflammable ſpirit is made, little inferior and ſometimes even ſuperior to the European. Another kind of wine is uſed by the Chineſe, or rather Tartars, called LAMB WINE. It is very ſtrong, and has a diſagreeable ſmell; as has alſo a kind of ſpirit diſtilled from the fleſh of ſheep; though this laſt is ſometimes uſed by the emperors.

(33.) CHINESE WRITING. There are 5 kinds of writing mentioned by the Chineſe literati; the moſt modern of which is a method of tracing out the characters with a pencil. This requires much experience; but it disfigures the characters greatly, and is only uſed in the preſcriptions of phyſicians, prefaces to books, and inſcriptions of fancy. The tracing of characters, with neatneſs and accuracy, is greatly admired in China. They are often preferred to the moſt elegant painting; and ſome will give a moſt exhorbitant price for a page of an old book, if it happens to be neatly written. They pay particular attention to well formed characters, even in the moſt common books; and if any of the leaves happen to fall off, will replace them with the greateſt care. To apply them to any vile purpoſe, tread them under foot, &c. would be reckoned an unpardonable violation of decency. Punctuation was not formerly uſed in China, nor are points yet employed in works of an elevated ſtyle, or ſuch as are to be preſented to the emperor.

CHINEY, or CINEY, a town of France, in the department of the Sambre and Meuſe, late of Germany, in the circle of Weſtphalia, and biſhopric of Leige; 10 miles NE. of Dinant, and 28 SSW. of Leige.

* CHINK. *n. ſ.* [*cinan*, to gape, Sax.] A ſmall aperture longwiſe; an opening or gap between the parts of any thing.—Pyramus and Thiſbe did talk through the *chink* of a wall. *Shak.*

(1.) * *To* CHINK. *v. a.* [derived by *Skinner* from the ſound.] To ſhake ſo as to make a ſound.—

He *chinks* his purſe, and takes his ſeat of ſtate;
With ready quills the dedicators wait. *Pope.*

(2.) * *To* CHINK. *v. n.* To ſound by ſtriking each other.—Lord Strutt's money ſhines as bright, and *chinks* as well, as 'ſquire South's. *Arbuthnot.*

CHINKAPIN. See FAGUS.

* CHINKY. *adj.* [from *chink*.] Full of holes; gaping; opening into narrow clefts.—

Grimalkin, to domeſtick vermin ſworn
An everlaſting foe, with watchful eye
Lies nightly brooding o'er a *chinky* gap. *Philips.*

CHINNOR, a muſical inſtrument among the Hebrews, conſiſting of 32 chords. We have given a figure of it, from Kircher. See *Plate* LXIII. *Fig.* 21.

CHINNON, or CHINON, an ancient town of France, in the department of Indre and Loire, and ci-devant province of Touraine; memorable for the death of Henry II. of England; for the birth of the famous Rabelais and Quillet; and for the firſt appearance of that celebrated heroine, Joan of Arac, in her military habit, before king Charles VII. It contains about 5000 inhabitants; and is ſeated on the river Vienne, in a fertile and pleaſant country, 10 miles N. of Richelieu, and 150 SW. of Paris. Lon. 0. 22. E. Lat. 47. 12. N.

To CHINSE, *v. a.* in ſea language, is to thruſt oakum into a chink with the point of a chiſſel.

CHINSURA, a town of Hindooſtan, in the country of Bengal, ſituated on the river Hoogly, between Chandernagore and the old town of Hoogly. It is a populous and commercial town, and the houſes are built in the European ſtyle. It has a fortreſs defended by four baſtions and a ditch, after the European form of military architecture; and the paſſage of the river is defended by 24 cannons. This town formerly belonged to the Dutch, but it was taken poſſeſſion of by the Britiſh in 1795. It is 17 miles N. of Calcutta.

* CHINTS. *n. ſ.* Cloth of cotton made in India, and printed with colours.—

Let a charming *chints*, and Bruſſels lace,
Wrap my cold limbs, and ſhade my lifeleſs face. *Pope.*

CHIO, or Chios, an Aſiatic iſland, lying near the coaſt of Natolia, oppoſite to Ionia. It was alſo known to the ancients by the names of Æthalia, Macris, Pithynia, &c According to Herodotus, Chios was originally peopled from Ionia. It was at firſt governed by kings; but became afterwards a republic, which by the direction of Iſocrates was modelled after that of Athens. The people were, however, ſoon enſlaved by tyrants, and afterwards conquered by Cyrus king of Perſia. They joined the other Grecians in the Ionian revolt; but were ſhamefully abandoned by the Samians, Leſbians, and others of their allies; ſo that they were again reduced under the yoke of the Perſians, who treated them with the utmoſt ſeverity. They continued ſubject to them till the battle of Mycale, when they were reſtored to their ancient liberty; which they enjoyed till the downfal of the Perſian empire, when they became ſubject to the Macedonian princes. In the time of Veſpaſian, the iſland was reduced to the form of a Roman province; but the inhabitants were allowed to live according to their own laws, under the ſuperintendance of a prætor. It is now ſubject to the Turks, and is called Scio. See that article.

CHIOCOCCA, in botany, a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 48th order, *Aggregatæ.* The corolla is funnel-ſhaped and equal; the berry unilocular, diſpermous, inferior.

CHIOGGIO. See Chioza.

CHIOMARA, the heroic wife of Ortiagon, a Gauliſh prince, a lady equally admirable for beauty and chaſtity. During the war between the Romans and the Gauls, A. U. C. 563, the latter were totally defeated on Mount Olympus. Chiomara, among many other ladies, was taken priſoner, and committed to the care of a centurion, no leſs paſſionate for money than women. He, at firſt, endeavoured to gain her conſent to his infamous deſires; but not being able to ſubvert her conſtancy, he employed force. To make her amends he offered her liberty, but not without ranſom. He agreed with her for an Attic talent, and to conceal his deſign from the Romans, he permitted her to ſend any of the priſoners ſhe choſe to her relations, and aſſigned a place near the river where ſhe ſhould be exchanged for the gold. She fixed upon a ſlave of her own, who was among the priſoners; and the centurion ſoon after carried her beyond the advanced poſts, under cover of a dark night. The next evening two of the relations of the princeſs came to the place appointed, whither the centurion alſo carried his captive. When they had delivered him the ſum agreed on, the lady, in her own language, ordered thoſe who came to receive her to draw their ſwords and kill the centurion, who was then weighing the gold. Having thus revenged the injury done her chaſtity, ſhe took the centurion's head, which ſhe cut off with her own hands, and hiding it under her robe, went to her huſband Ortiagon, who had returned home after the defeat of his troops. As ſoon as ſhe came into his preſence, ſhe threw the head at his feet. Surpriſed at ſuch a ſight, he aſked her whoſe head it was, and what had induced her to do an action ſo uncommon to her ſex? With a face covered with a ſudden bluſh, but at the ſame time expreſſing her fierce indignation, ſhe declared the outrage that had been done her, and the revenge ſhe had taken for it. During the reſt of her life, ſhe ſtedfaſtly retained the ſame attachment to that purity of manners which conſtitutes the principal glory of her ſex.

CHIONANTHUS, the Snow-drop or fringe tree, a genus of the monogynia order, belonging to the diandria claſs of plants; and in the natural method ranking under the 44th order, *Sepiariæ.* The corolla is quadrifid, with the ſegments very long; the fruit is a plum. There is but one ſpecies particularly deſcribed by botaniſts, viz.

Chionanthus Virginica, common in Virginia and South Carolina, where it grows by the ſide of rivulets. It riſes to ten feet; the leaves are as large as thoſe of the laurel, but much thinner. The flowers come out in May, and are of a pure white; whence the name *ſnow-drop tree.* They hang down in large branches, and are cut into narrow ſegments; whence its other name of *fringe tree.* After the flowers are fallen off, the fruit appears, which grows to the ſize of a ſloe, having a ſtone in the middle. The plants are propagated from ſeeds ſown on a hot bed, and kept in a ſtove. Some have been raiſed from layers; but this method is very precarious, and therefore the other is to be preferred. The ſeeds muſt be procured from America, for they never came to perfection in this country.

(1.) CHIONE, in fabulous hiſtory, the daughter of Dædalion, of whom Apollo and Mercury became enamoured. After her commerce with the gods, ſhe was changed by Juno into a hawk.

(2.) Chione, the daughter of Boreas and Orithyia, and mother of Eumolpus by Neptune. She threw her ſon into the ſea; but he was preſerved by his father.

* CHIOPPINE. *n. ſ.* [from *chapin*, Spaniſh.] A

high ſhoe formerly worn by ladies.—Your ladyſhip is nearer to heaven than when I ſaw you laſt, by the altitude of a *chioppine*. *Shakeſpeare*.—The woman was a gianteſs, and yet walked always in *chioppines*. *Cowley*.

(1.) CHIOURLIC, a river in Romania.

(2.) Chiourlic, an ancient town of European Turky, in Romania, with a Greek biſhop's ſee; ſeated on the above river, 47 miles W. of Conſtantinople. Lon. 27. 57. E. Lat. 41. 8. N.

(1.) CHIOZZA, or Chioggia, a diſtrict of Italy, in the ci-devant territory of Venice, annexed to Auſtria in 1797, and to the kingdom of Italy in 1806. It has been generally ſpoken of as an iſland; but Dr Oppenheim appears to be more correct in deſcribing it as a diſtrict, bounded on the W. by the territory of Padua, and containing a part of the Lagunes, which affords an abundance of wild fowl, fiſh, and ſalt,—and part of the continent, in a high ſtate of cultivation. "This diſtrict (he adds) contains one town, one borough, ſix villages, 3 harbours, and 40,000 inhabitants."

(2.) Chiozza, the capital of the above diſtrict, anciently called *Clodia, Cluggia, Foſſa Claudia*, is ſituated on a canal, and connected with the banks of the Brondŏla, by a ſtone bridge of 43 arches and 250 paces long. The town is two miles in circumference, contains three churches, eight monaſteries, 25,000 induſtrious inhabitants. It lies 18 m. S. of Venice. Lon. 12. 9. E. Lat. 45. 17. N.

(1.) * CHIP, Cheap, Chipping, in the names of places, imply a market; from the Sax. *cyppan*, to buy. *Gibſon*.

(2.) * Chip. *n. ſ.* [from the verb.] 1. A ſmall piece taken off by a cutting inſtrument.—Cucumbers do extremely affect moiſture, and over-drink themſelves, which chaff or *chips* forbiddeth. *Bacon*. 2. A ſmall piece, however made.—The manganeſe lies in the vein in lumps wrecked, in an irregular manner, among clay, ſpar, and *chips* of ſtone *Woodward*.

(1.) * *To* Chip. *v. a.* [probably corrupted from *chop*.] To cut into ſmall pieces; to diminiſh, by cutting away a little at a time.—

Induſtry
Taught him to *chip* the wood, and hew the ſtone.
Thomſon.

(2.) *To* Chip, *v. n.* To fly. See Chipping, § 2.

(1.) CHIPPAWAS, a ſmall tribe of about two hundred North American Indians, who reſide near Sanguinam bay of Lake Huron.

(2–4.) Chippawas, three other tribes of North American Indians, who reſide near Michillimackinac, on Lake Superior. Their number is eſtimated at 5500. Theſe tribes made peace with the United States, Auguſt 3, 1795.

(1.) CHIPPENHAM, a thorough-fare town of Wiltſhire, ſeated on the Avon. It has a handſome ſtone bridge, over the river, of 16 arches; and ſends two members to parliament. It is populous, and was anciently a ſeat of King Alfred the Great. It has a market on Thurſday, and 4 fairs, May 6, June 11, Oct. 18, and Nov. 30. It carries on a manufacture of ſuperfine woollen cloth, and lies 21 miles E. of Briſtol, and 94 W. of London. Lon. 2. 8. W. Lat. 51. 27. N.

(2.) Chippenham, 14 miles from Cambridge.

(1.) * CHIPPING. *n. ſ.* [from *To Chip*.] A fragment cut off.—They dung their land with the *chippings* of a ſort of ſoft ſtone. *Mort. Huſb*.

(2.) Chipping, *part.* the flying off of ſmall pieces, or breaking at the edges, of porcelain, ſtone, or earthen ware; an accident common in theſe manufactures. Our earthen wares are particularly ſubject to it, and are ſpoiled by it before any other flaw appears in them. Our ſtone wares eſcape it better; but not ſo well as the porcelain of China, which is leſs ſubject to it than any other manufacture in the world. The method by which the Chineſe defend their wares from this accident, is this: They carefully burn ſome ſmall bamboo canes to a charcoal, which is very light, and very black; this they reduce to a fine powder, and then mix it into a thin paſte, with ſome of the varniſh they uſe for their ware; they next take the veſſels when dried, and not yet baked, to the wheel; and turning them ſoftly round, they, with a pencil dipt in this paſte, cover the whole circumference with a thin coat of it; after this, the veſſel is again dried; and the border made with this paſte appears of a pale greyiſh colour when it is thoroughly dry. They work on it afterwards in the common way, covering both this edge and the reſt of the veſſel with the common varniſh. When the whole is baked on, the colour given by the aſhes diſappears, and the edges are as white as any other part; only when the baking has not been ſufficient, or the edges have not been covered with the ſecond varniſhing, we ſometimes find a duſky edge, as in ſome of the ordinary thick tea-cups. It might be a great advantage to our Engliſh manufactures to attempt ſomething of this kind. The willow makes a very light and black charcoal; but the elder, though ſeldom uſed, greatly exceeds it. The young green ſhoots of this ſhrub, which are almoſt all pith, make the lighteſt and the blackeſt of all charcoal; this readily mixes with any liquid, and might be eaſily uſed in the ſame way that the Chineſe uſe the charcoal of the bamboo cane, which is a light hollow vegetable, more reſembling the elder ſhoots than any other Engliſh plant. The fixed ſalt and oil contained in this charcoal penetrates the yet raw edges of the ware, and gives them in the ſubſequent baking a ſomewhat different degree of vitrification from the other parts of the veſſel; which, though, if given to the whole, it might take off from the true ſemi-vitrified ſtate of that ware, yet at the edges is not to be regarded, and only ſerves to defend them from common accidents, and keep them entire. The Chineſe uſe two cautions in this application: the firſt in the preparation; the 2d in the laying it on. They prepare the bamboo canes for burning into charcoal, by peeling off the rind. This might eaſily be done with our elder ſhoots, which are ſo ſucculent, that the bark ſtrips off with a touch. The Chineſe ſay, that if this is not done with their bamboo, the edges touched with the paſte will burſt in the baking. This does not ſeem indeed very probable; but the charcoal will certainly be lighter made from the peeled ſticks, and this is a known advantage. The other caution is, never to touch the veſſel with hands that have any greaſy or fatt ſubſtance about them; for if this is done, they always find the veſſel crack in that place.

CHIRAGRA, the gout in the hands.

* **CHIRAGRICAL.** *adj.* [*chiragra*, Latin.] Having the gout in the hand; ſubject to the gout in the hand.—*Chiragrical* perſons do ſuffer in the finger as well as in the reſt, and ſometimes firſt of all. *Brown.*

CHIRIQUI, or CHIRIQUITA, a town of Mexico, in the province of Veragua, on the coaſt of the Pacific ocean, with a harbour about 3 miles from the ſea, and 8 miles from the town. It is 30 leagues W. of St Jago. Lon. 65. 50. W. Ferro. Lat. 11. 20. N.

CHIRK, a village in Denbighſhire, S. of Wrexham. It had formerly two caſtles on the top of a hill, one of which is ſtill almoſt entire, and has been a magnificent ſtructure.

(1.) **CHIRNSIDE**, a pariſh of Scotland, in Berwickſhire, nearly 4 miles long, and not quite 3 broad, containing about 6,523 acres, and comprehending the baronies of Chirnſide and Idington. The climate is dry and healthy, and ſuch improvements have been made upon the ſoil, of late years, that the land is now quadruple its former value. The population, alſo, within the laſt 40 years is nearly tripled in 1801, it amounted to 1107. In this pariſh, there are ſeveral of thoſe veſtiges of feudal antiquity called *baſtels*, or *baſtiles*. See BASTILES, § 5.

(2.) CHIRNSIDE, a village and burgh of barony in the above pariſh, ſituated on Chirnſide hill. It conſiſts of two ſtreets running from E. to W. over the broad ſummit of the hill, for nearly half a mile: but the greater part of the houſes are built of clay. It contains upwards of 600 inhabitants, is the ſeat of a preſbytery, and has an annual fair on the laſt Thurſday of Nov. chiefly for the ſake of ſack-cloth and linen yarn.

(3.) CHIRNSIDE HILL, a hill in the above pariſh, diſtinguiſhed by its elevation and ſemicircular aſpect to the S. and commanding a fine proſpect of one of the moſt fertile countries in Scotland, extending above 25 miles from the bay of Berwick to the Tiviotdale hills on the W. and about as far directly S. to the Cheviot hills. The ſoil of this hill is naturally fertile and it contains great ſtores of free ſtone and marl.

(1.) **CHIROGRAPH**, an ancient deed, which, requiring a counterpart, was engroſſed twice on the ſame piece of parchment, counterwiſe; leaving a ſpace between, wherein was written CHIROGRAPH; through the middle whereof the parchment was cut, ſometimes ſtraight, ſometimes indentedly; and a moiety given to each of the parties. This was afterwards called *dividenda*, and *chartæ diviſæ*; and was the ſame with what we now call *charter-party*. See CHARTER-PARTY. The firſt uſe of theſe chirographs in Britain was in the time of Henry III.

(2.) CHIROGRAPH was alſo anciently uſed for a fine: and the manner of engroſſing the fines, and cutting the parchment in two pieces, is ſtill retained in the CHIROGRAPHER's office.

(1.) * **CHIROGRAPHER.** *n. ſ.* [χειρ, the hand, and γραφω, to write.] He that exerciſes or profeſſes the art or buſineſs of writing.—Thus paſſeth it from this office to the *chirographer*'s to be engroſſed. *Bacon.*

(2.) CHIROGRAPHER OF FINES, an officer in the Common Pleas, who engroſſes FINES acknowledged in that court, into a perpetual record (after they have been examined, and paſſed by other officers), and writes and delivers the indentures thereof to the party. He makes two indentures: one for the buyer, the other for the ſeller; and a third indented piece, containing the effect of the fine, and called *the foot of the fine;* and delivers it to the *cuſtos brevium*. This officer, or his deputy, proclaims all fines in court every term, and indorſes the proclamations on the back ſide of the foot; keeping the writ of covenant, and the note of the fine.

* **CHIROGRAPHIST.** *n. ſ.* [See CHIROGRAPHER.] The art of writing.

* **CHIROMANCER.** *n. ſ.* [See CHIROMANCY.] One that foretells future events by inſpecting the hand.

(1.) * **CHIROMANCY.** *n. ſ.* [χειρ, the hand, and μαντις, a prophet.] The art of foretelling the events of life, by inſpecting the hand. There is not much conſiderable in that doctrine of *chiromancy*, that ſpots in the top of the nails do ſignify things paſt; in the middle, things preſent; and at the bottom, events to come. *Brown.*

(2.) CHIROMANCY. See DIVINATION.

CHIRON, the ſon of Saturn and Phillyra, a famous perſonage of antiquity; ſtyled, by Plutarch, in his dialogue on muſic, *The wiſe Centaur*. Sir Iſaac Newton places his birth in the firſt age after Deucalion's deluge. He is ſaid to have been born in Theſſaly among the CENTAURS, who were the firſt Greeks that had acquired the art of breaking and riding horſes: whence the poets, painters, and ſculptors, have repreſented them as compounds of man and horſe; and perhaps it was at firſt imagined by the Greeks, as it was by the Americans, when they firſt ſaw cavalry, that the horſe and the rider conſtituted the ſame animal. Chiron was repreſented by the ancients as one of the firſt inventors of medicine, botany, and *chirurgery;* a word which ſome etymologiſts have derived from his name. He inhabited a grotto at the foot of Mount Pelion, which, from his great knowledge became the moſt frequented ſchool throughout Greece. Almoſt all the heroes of his time were fond of receiving his inſtructions; and Xenophon enumerates the following among his diſciples: Cephalus, Æſculapius, Melampus, Neſtor, Amphiaraus, Peleus, Telamon, Meleager, Theſeus, Hippolitus, Palamedes, Ulyſſes, Mneſtheus, Diomedes, Caſtor, Pollux, Machaon, Podalirius, Antilochus, Æneas, and Achilles. From this catalogue it appears, that Chiron frequently inſtructed both fathers and ſons; and Xenophon has given a ſhort eulogium on each, which redounds to the honour of the preceptor. The Greek hiſtorian, however, has omitted ſeveral others of his ſcholars; ſuch as Bacchus, Phænix, Cocytus, Aryſtæus, Jaſon, Medeus, Ajax, and Proteſilaus. It is pretended that Bacchus was the favourite ſcholar of the Centaur; and that he learned of this maſter the revels, orgies, bacchanalia, and other ceremonies of his worſhip. Plutarch ſays that Chiron taught Hercules muſic, medicine and juſtice; though Diodorus Siculus tells us, that Linus was the muſic maſter of this hero. But among all the heroes who have been diſciples of this Centaur, no one reflected ſo much honour upon him as Achilles, whoſe renown he in ſome meaſure ſhared. Apollodorus tells us, that he taught him muſic, as a bridle to the impetuoſity of his temper. One of the beſt remains of antique painting now exiſting, is a picture dug out of the ruins of Herculaneum, in which Chiron is teaching young Achilles to play on the lyre. The death of this philoſophic muſician was occaſioned, at an extreme old age, by an accidental wound in the knee with a poiſoned arrow, ſhot by his ſcholar Hercules at another. He was placed after his death by Muſæus among the conſtellations, in gratitude for the great ſervices which he had rendered the people of Greece. Sir Iſaac Newton ſays that the conſtellations were formed by Chiron and Muſæus for the uſe and honour of the Argonauts: as a proof of which nothing later than the expedition was delineated on the ſphere: and he adds that Chiron was then 88 years old, and lived till after the Argonautic expedition, in which he had two grandſons. The ancients attribute to him ſeveral writings; among which, according to Suidas, are Ὑποθηκας, *precepts*, in verſe, compoſed for the uſe of Achilles; and Ἱππιατρικον, a medical treatiſe on the *Diſeaſes incident to Horſes* and other quadrupeds. Fabricius gives a liſt of the works attributed to Chiron; diſcuſſes the claims which have been made for others to the ſame writings; and gives him a diſtinguiſhed place in his catalogue of ancient phyſicians.

CHIRONIA, in botany: A genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 20th order, *Rotaceæ*. The corolla is wheel-ſhaped; the piſtil declining downwards; the ſtamina placed in the tube of the corolla; the antheræ in their laſt ſtage ſpiral; the ſeed-caſe bilocular. There are 8 ſpecies, of which the moſt remarkable is the

CHIRONIA FRUTESCENS, a native of the Cape of Good Hope. The root is fibrous, and ſpreads near the ſurface of the ground. The ſtalks are round, and ſomewhat ligneous, but of a very ſoft texture. They riſe from 2 to 3 feet high, ſending out ſeveral branches which grow erect, and are garniſhed with ſucculent leaves an inch or more in length, and about ¼ of an inch in breadth. At the end of each ſhoot the flowers are produced, which are tubulous, and ſpread open at the top. They are of a bright red colour, and when a large number of them open on the ſame plant, they make a fine appearance. They are produced from June to autumn; and the ſeeds ripen in October. The plants are propagated by ſeeds, which muſt be ſown in pots filled with light ſandy earth, and plunged in a moderate hot-bed. In ſummer they may be inured to the open air; but muſt always be ſheltered in winter.

CHIRONIUM, in medicine, a great ulcer of difficult cure.

CHIRONOMI, actors who performed without uſing words, by the motions of the hand.

CHIRONOMIA, } CHIRONOMY, } in antiquity, the art of repreſenting any paſt tranſaction by the motions of the hands. This made a part of liberal education; it had the approbation of Socrates, and was ranked by Plato among the political virtues.

CHIROTHESIA, [from χειρ, the hand, and τιθημι, to lay,] the impoſition of hands in conferring prieſtly orders.

CHIROTONIA, } CHIROTONY, } [from χειρ and τεινω, to ſtretch forth,] in antiquity, the ſtretching forth, or holding up of hands, in electing magiſtrates, &c. This cuſtom was firſt eſtabliſhed in Greece; as appears from an oration of Demoſthenes againſt Neæra, and that of Æſchines againſt Cteſiphon: thence it paſſed to the Romans; and from prophane authors it paſſed to eccleſiaſtical ones. For the difference between CHIROTHESIA, and CHIROTONIA, ſee *Harrington's Prerogatives of popular government.*

* CHIRP. *n. ſ.* [from the verb.] The voice of birds or inſects.—

Winds over us whiſper'd, flocks by us did bleat,
And, *chirp* went the graſhopper under our feet.
Spectator.

(1.) * *To* CHIRP. *v. a.* [This ſeems apparently corrupted from *cheer up.*] To make cheerful.—

Let no ſober bigot here think it a ſin,
To puſh on the *chirping* and moderate bottle.
Johnſon.

(2.) * *To* CHIRP. *v. n.* [perhaps contracted from *cheer up.* The Dutch have *circken.*] To make a cheerful noiſe; as birds, when they call without ſinging.—

Came he right now to ſing a raven's note;
And thinks he, that the *chirping* of a wren
Can chaſe away the firſt conceived ſound? *Shak.*
The careful hen
Calls all her *chirping* family around. *Thomſon.*

* CHIRPER. *n. ſ.* [from *chirp.*] One that chirps; one that is cheerful.

* *To* CHIRRE. *v. n.* [*ceorian,* Saxon.] See CHURME.—To coo as a pigeon. *Junius.*

CHIRVAN, a province of Perſia, lying on the W. coaſt of the Caſpian Sea.

(1.) * CHIRURGEON. *n. ſ.* [χειρουργος, from χειρ, the hand, and εργον, work.] One that cures ailments, not by internal medicines, but outward applications. It is now generally pronounced, and by many written, *ſurgeon.*—When a man's wounds ceaſe to ſmart, only becauſe he has loſt his feeling, they are nevertheleſs mortal, for his not ſeeing his need of a *chirurgeon. South.*

(2.) CHIRURGEON. See SURGEON.

* CHIRURGERY, *n. ſ.* [from *chirurgeon*] The art of curing by external applications. This is called *Surgery.*—Nature could do nothing in her caſe without the help of *chirurgery,* in drying up the luxurious fleſh, and making way to pull out the rotten bones. *Wiſeman.*

* CHIRURGICAL. } * CHIRURGICK. } *adj.* See CHIRURGEON. 1. Having qualities uſeful in outward applications to hurts.—As to the *chirurgical* or phyſical virtues of wax, it is reckoned a mean between hot and cold. *Mortimer.* 2. Relating to the manual part of healing. 3. Manual in general, conſiſting in operations of the hand. This ſenſe, though the firſt, according to etymology, is now ſcarce found.—The *chirurgical* or manual part doth refer to the making inſtruments, and exerciſing particular experiments. *Wilkins.*

CHIRURGO-OBSTETRICAL SOCIETY, a ſociety inſtituted at Edinburgh in 1785, for improvement in medical knowledge in general, but chiefly in ſurgery and midwifery. Its meetings were held in the late Dr Aitken's hall, but were dropt in Nov. 1791, not long after the doctor's death.

CHIRURGO-PHYSICAL SOCIETY, a ſociety inſtituted at Edinburgh, in Nov. 1788, by a number of ſtudents of medicine, for the improvement of its members in medicine and ſurgery. In 1794, this ſociety formed a junction with the AMERICAN PHYSICAL SOCIETY of Edinburgh; and ſoon after, theſe conjoined ſocieties were united with the ROYAL PHYSICAL SOCIETY, which has long been in a flouriſhing ſtate, and has an excellent library. Many of its members have diſtinguiſhed themſelves in the republic of letters, by their productions, in medicine and other ſciences.

(1.) * CHISEL. *n ſ.* [*ciſeau*, Fr. of *ſciſſum*, Lat.] An inſtrument with which wood or ſtone is pared away.

(2.) CHISELS, or CHISSELS, are alſo uſed in carving ſilver work, ſuch as buckles, ſpoons, &c. There are chiſſels of different kinds; though their chief difference lies in their different ſize and ſtrength, as being all made of ſteel well ſharpened and tempered; but they have different names, according to the different uſes to which they are applied.—The chiſſels uſed in carpentry and joinery are, 1. The *former;* which is uſed firſt of all, juſt after the work is ſcribed. 2. The *pairing chiſſel;* which has a fine ſmooth edge, and is uſed to pare off or ſmooth the irregularities which the former makes. This is not ſtruck with a mallet as the former is, but is preſſed down by the workman. 3. The *Skew-former;* is uſed for cleanſing acute angles with the point or corner of its narrow edge. 4. The *mortiſe-chiſſel* is narrow, but very thick and ſtrong, to endure hard blows, and it is cut to a very broad baſil. Its uſe is to cut deep ſquare holes in the wood for mortiſes. 5. The *gouge*, is a chiſſel with a round edge; one ſide whereof ſerves to prepare the way for an augre, and the other to cut ſuch wood as is to be rounded, hollowed, &c. 6. *Socket-chiſſels*, are chiefly uſed by carpenters, &c. have their ſhanks with a hollow ſocket at top, to receive a ſtrong wooden ſprig, fitted into them with a ſhoulder. Theſe chiſſels are diſtinguiſhed, according to the breadth of the blade, into half-inch chiſſels, three quarters of an inch chiſſels, &c. 7. The *ripping chiſſel*, is a ſocket-chiſſel of an inch broad, having a blunt edge, with no baſil. Its uſe is to rip or tear two pieces of wood aſunder, by forcing in the blunt edge between them.

* *To* CHISEL. *v. a.* [from the noun.] To cut with a chiſſel.

CHISLEHURST, a village in Kent, near Eltham and Bromley, 11 miles E. of London. This village was the birth-place of Sir Nicholas Bacon and Sir Francis Walſingham; and here is Camden palace, the reſidence of the celebrated antiquarian of that name.

CHISLEY LAND, in agriculture, a ſoil of a middle nature between ſandy and clayey land, with a large admixture of pebbles.

CHISME, a ſea port of Natolia, ſeated on the ſtrait that divides the continent from the iſle of Scio. It was anciently called CYSSUS, and was famous for the great victory obtained by the Romans over the fleet of Antiochus, A. A. C. 191. and has been lately no leſs diſtinguiſhed by the total deſtruction of the Turkiſh fleet, by the Ruſſians, in 1770. It is 40 miles W. of Smyrna. Lon. 44. 2. E. Ferro. Lat. 38. 24. N.

CHISOIN, or CHISOING, a town of France, in the dept. of the North, late of Flanders, where Louis XV. took up his reſidence during the campaign of 1744. It is two leagues NNW. from Orchies. Lon. 3. 21. E. Lat. 43. 12. N.

CHISSAMO, a town of the iſland of Candia, ſituated on the N. ſide of the iſland, in a bay to which it gives name. It is 25 miles W. of Canea.

CHISSELBOROUGH, a town in Somerſetſhire, 4 miles from Crookhorn.

* CHIT. *n. ſ.* [according to Dr *Hickes*, from *kind*, Germ. child; perhaps from *chico*, little, Span.] 1. A child; a baby. Generally uſed of young perſons in contempt.—

These will appear ſuch *chits* in ſtory,
'Twill turn all politicks to a jeſt. *Anonymous.*

2. The ſhoot of corn from the end of the grain. A cant term with maltſters.—Barley, couched four days, will begin to ſhew the *chit* or ſprit at the root-end. *Mortimer.* 3. A freckle; [from chickpeaſe.] In this ſenſe it is ſeldom uſed.

* *To* CHIT. *v. n.* [from the noun.] To ſprout; to ſhoot at the end of the grain: cant.—I have known barley *chit* in ſeven hours after it had been thrown forth. *Mortimer.*

* CHITCHAT. *n. ſ.* [corrupted by reduplication from *chat.*] Prattle; idle prate; idle talk. A word only uſed in ludicrous converſation.—I am a member of a female ſociety, who call ourſelves the *chitchat* club. *Spectator.*

CHITON, [from χιτων, a coat of mail,] in zoology, a genus of the order of vermes teſtaceæ. The ſhell is plated, and conſiſts of many parts lying upon each other tranſverſely: the inhabitant is a ſpecies of DORIS. They are common on the the ſhores of Scarborough, Aberdeen, and Lochbroom. See ſeveral ſpecies repreſented of their natural ſize on *Plate* LXV. *fig.* 10—14.

(1.) CHITOR, a city of Italy, in Piedmont, ſeated on the Po, 10 miles N. of Turin. Lon. 7. 35. E. Lat. 45. 12. N.

(2.) CHITOR, a province of India, ſubject to the Great Mogul.

(3.) CHITOR, the capital of the province, (N° 2.) ſuppoſed to have been the capital of the dominions of king Porus, who fought with Alexander the Great. It lies 256 miles NE. of Surat. Lon. 76. 10. E. Lat. 23. 30. N.

CHITRO, a town of European Turkey, ſeated on the bay of Salonichi, in Macedonia; where the mother, wife, and ſon of Alexander the Great were murdered by Caſſander. Near this town Perſeus the laſt king of Macedon was defeated by the Romans. Lon. 22. 35. E. Lat. 40. 20. N.

CHITTEDROOG, a town of Hindooſtan, in the kingdom of Myſore, 85 miles NW. of Seringapatam, and 95 E. of Bedanore. Lon. 76. 15. E. Lat. 14. 5. N.

(1.) CHITTENDEN, a county in the State of Vermont, bounded on the N. by Canada; on the S. by Addiſon county; on the E. by Orange, and on the W. by lake Champlain, which ſeparates it from New York. It is 59 m. long, and 57 broad. On lake Champlain it is fertile, but in the E. it is mountainous. It is divided into 44 townſhips, and in 1790, it contained 7,301 inhabitants. It is watered by the Lamoille, Michiſcoui, and Onion rivers. Burlington is the chief town.

(2.) **CHITTENDEN**, a townſhip of Vermont, in Rutland county.

* **CHITTERLINGS.** *n. ſ.* without ſingular. [from *ſchyterlingh*, Dut. *Minſhew*; from *kutteln*, Germ. *Skinner*.] The guts; the bowels. *Skinner.*

CHITTIM, in ancient geography, according to Le Clerc, Calmet, and others, was the ſame with Macedonia, peopled by Kittim, the ſon of Javan the grandſon of Noah. See KITTIM.

CHITTINGLEY, a village in Suſſex, NW. of Haylſham.

CHITTRICK's MEDICINE FOR THE STONE. This medicine was ſome years ago kept as a ſecret, and had great reputation as a lithontriptic, which indeed it ſeems in many caſes to deſerve. It was diſcovered by Dr Blackrie to be no other than ſoap lye; and the following receipt for uſing it was procured by General Dunbar: "Take one tea ſpoonful of the ſtrongeſt ſoap lye, mixed in two table ſpoonfuls of ſweet milk, an hour before breakfaſt, and at going to bed. Before the medicine, take a ſup of pure milk, and immediately after it, another. If you find this agrees with you for 2 or 3 days, you may add half as much more to the doſe."

* **CHIVALROUS.** *adj.* [from *chivalry*.] Relating to chivalry, or errant knighthood; knightly; warlike; adventurous; daring. A word now out of uſe.—

And noble minds of yore allied were
In brave purſuit of *chivalrous* empriſe. *Fairy Q.*

(1.) * **CHIVALRY.** *n. ſ.* [*chevalerie*, Fr. knighthood, from *cheval*, a horſe; as *eques* in Latin.] 1. Knighthood; a military dignity.—There be now, for martial encouragement, ſome degrees and orders of *chivalry*; which, nevertheleſs, are conferred promiſcuouſly upon ſoldiers and no ſoldiers. *Bacon's Eſſays.* 2. The qualifications of a knight; as valour; dexterity in arms.—

Thou haſt ſlain
The flower of Europe for his *chivalry*. *Shak.*

3. The general ſyſtem of knighthood.—

By the faith which knights to knighthood bore,
And whate'er elſe to *chivalry* belongs. *Dryd.*

4. An adventure; an exploit. Not now in uſe.—They four doing acts more dangerous, though leſs famous, becauſe they were but private *chivalries*. *Sidney.* 5. The body or order of knights.—

And by his light
Did all the *chivalry* of England move. *Shak.*

6. In law.—*Servitium militare*, of the French *chevalier*; a tenure of land by knights ſervice. There is no land but is holden mediately or immediately of the crown, by ſome ſervice or other; and therefore are all our freeholds, that are to us and our heirs, called *feuda*, fees, as proceeding from the benefit of the king. As the king gave to the nobles large poſſeſſions, for this or that rent and ſervice, ſo they parcelled out their lands, ſo received for rents and ſervices as they thought good: and thoſe ſervices are by Littleton divided into *chivalry* and ſocage. The one is martial and military; the other, clowniſh and ruſtick. *Chivalry*, therefore, is a tenure of ſervice, whereby the tenant is bound to perform ſome noble or military office unto his lord, and is of two ſorts; either regal, that is, ſuch as may hold only of the king; or ſuch as may alſo hold of a common perſon as well as of the king. That which may hold only of the king is properly called ſergeantry, and is again divided into grand or petit, *i. e.* great or ſmall. *Chivalry* that may hold of a common perſon, as well as of the king, is called ſcutagium. *Cowel.* 7. It ought properly to be written *chevalry*. It is a word not much uſed, but in old poems or romances.

(2.) **CHIVALRY**, (§ 1. *def.* 3, 5.) is uſed to expreſs the peculiar privileges, obligations, and turn of mind, with all the other diſtinguiſhing characteriſtics of that order of men, who flouriſhed in Europe in the dark ages, during the vigour of the feudal ſyſtems of government, under the name of KNIGHTS, or KNIGHTS ERRANT.

(3.) **CHIVALRY**, in law. See § 1. *def.* 6. The tenant, or knight was bound to perform ſervice in war unto the king, or the meſne lord of whom he held by that tenure. And chivalry was either general or ſpecial: *general*, when it was only in the feoffment that the tenant held *per ſervitium militare*, without any ſpecification of ſergeantry, eſcuage, &c. *ſpecial*, when it was declared particularly by what kind of knight ſervice the land was held. See ESCUAGE, and SERGEANTRY.

(4.) **CHIVALRY**, ACCOUNT OF THE ORIGIN OF. In tracing the hiſtory of ſociety, and the diſtinctions which it naturally gives riſe to, it is obſervable, that difference of armour, and different modes of military diſcipline, produce diſtinction of orders among thoſe who practiſe the arts of war; while other circumſtances occaſion ſimilar changes to take place amidſt the ſcenes of peace. None of theſe diſtinctions is more remarkable, than that occaſioned by the uſe of horſes in military expeditions. To maintain a horſe, to equip him with coſtly furniture, to manage him with dexterity and vigour, are circumſtances which have invariably produced a ſtanding and conſpicuous diſtinction among the military order, wherever bodies of cavalry have been formed. The Roman *equites*, originally the only body of cavalry employed by the ſtate, occupied a reſpectable rank between the ſenators and the plebeians; and their manners were long ſuitable to their rank. In ancient Greece, and in the celebrated monarchies of Aſia, the ſame diſtinction prevailed at a ſimilar period. As the circumſtances and principles on which this diſtinction depends, are not confined to one particular nation, or one region of the globe, we may trace their effects even among the ſavage warriors of Scythia and Germany. From the valuable treatiſe of Tacitus *de moribis Germanorum*, we learn, that among the German warriors a diſtinction ſomewhat of this nature actually ſubſiſted; though indeed the chief diſtinction was between thoſe whom vigour of body and energy of mind enabled to brave all dangers; and thoſe, whom imbecility of either, incapacitated for heroic deeds. But another characteriſtical diſtinction in the manners of the barbarians of Germany before they eſtabliſhed themſelves in the cultivated provinces of the Roman empire is, that their women, contrary to what we find among many other rude nations, were treated with a high degree of reſpect. They did not vie with the men in deeds of valour, but they animated them to diſtinguiſh themſelves in the field; and virgins eſpecially were conſidered with a ſacred veneration, as endowed with prophetic powers, capable of foreſeeing future events, and even of influencing the will of the deities. Hence, though domeſtic duties were their peculiar province, yet they were not harſhly treated, nor confined to a ſtate of ſlavery. There appears indeed a ſtriking analogy between the condition of the women, among the rude ſoldiers of Sparta, and the rank which they occupied among the warlike cantons of Germany; though that of the latter ſeems to have been the moſt honourable. In the foreſts of Germany, theſe conquerors of the Roman empire, before they penetrated into its provinces, treated their women with a degree of reſpect unknown to moſt nations of antiquity. The character of the warrior was likewiſe highly honourable, being underſtood to unite all thoſe qualities which were in high eſtimation. When thoſe nations ſallied from their deſerts and foreſts, and over-ran the Roman empire, and eſtabliſhed themſelves in its provinces, the change which took place on their circumſtances was remarkable; and produced an equally remarkable change on their habits, cuſtoms, and manners. The great outlines might ſtill remain; but they could not fail to be filled up in a different manner. Here, however, the records of hiſtory are imperfect. But as ſoon as its light begins again to dawn, we find that the leading features of the barbarian character were not effaced, but only modified in a particular manner, in conſequence of their mixing among a more poliſhed people, becoming acquainted with the luxuries of life, and acquiring extenſive power and property. Thoſe who fought on horſeback now began to be diſtinguiſhed with peculiar honours. The manners of the warrior too were become more cultivated, and his ſpirit more humane. Leiſure and opulence, with the influence of a poliſhed people, even though in a ſtate of ſlavery, taught thoſe barbarians to aſpire after more refined pleaſures, and more ſplendid amuſements, than they had been before ſatisfied with. The influence of Chriſtianity too, which, though groſsly corrupted, was ſtill favourable to the ſocial happineſs of mankind, concurred to poliſh their manners, and exalt their character. Hence, in the end of the 10th and in the beginning of the 11th century, we ſee knight errantry, with that romantic gallantry, piety, and humanity, by which it was principally diſtinguiſhed, make its appearance. At the court of every prince, count, or baron, jouſts and tournaments became the favourite amuſements. At thoſe entertainments, ſkill in arms, devotion to the fair, and generous courteſy, were all at once cultivated. About this period began the cruſades; and theſe, to which alone ſome have referred the origin of chivalry, though they could not give riſe to what was already in exiſtence, yet moulded the form and directed the ſpirit of the inſtitution in ſuch a manner, as to raiſe it by a rapid progreſs from infancy, as it were, to full vigour and maturity. Its character, as it appeared when fully formed, is thus deſcribed by Mr Gibbon.

(5.) **CHIVALRY, CHARACTERISTICAL DESCRIPTION OF.** "Between the age of Charlemagne and that of the cruſades, a revolution had taken place among the Spaniards, the Normans, and the French, which was gradually extended to the reſt of Europe. The ſervice of the infantry was degraded to the plebeians; the cavalry formed the ſtrength of the armies, and the honourable name of *miles*, or ſoldier, was confined to the gentlemen who ſerved on horſeback, and were inveſted with the character of knighthood. The dukes and counts, who had uſurped the rights of ſovereignty, divided the provinces among their faithful barons: the barons diſtributed among their vaſſals the fiefs or benefices of their juriſdiction; and theſe military tenants, the peers of each other and of their lord, compoſed the noble or equeſtrian order, which diſdained to conceive the peaſant or burgher as of the ſame ſpecies with themſelves. The dignity of their birth was preſerved by pure and equal alliances; their ſons alone, who could produce four quarters or lines of anceſtry, without ſpot or reproach, might legally pretend to the honour of knighthood; but a valiant plebeian was ſometimes enriched and ennobled by the ſword, and became the father of a new race. A ſingle knight could impart, according to his judgement, the character which he received; and the warlike ſovereigns of Europe derived more glory from this perſonal diſtinction than from the luſtre of their diadem. This ceremony was in its origin ſimple and profane; the candidate, after ſome previous trial, was inveſted with his ſword and ſpurs; and his cheek or ſhoulder were touched with a ſlight blow, as an emblem of the laſt affront which it was lawful for him to endure. By ſuperſtition mingled in every public and private action of life; In the holy wars, it ſanctified the profeſſion of arms; and the order of chivalry was aſſimilated in its rights and privileges to the ſacred orders of prieſthood. The bath and white garment of the novice, were an indecent copy of the regeneration of baptiſm: his ſword, which he offered on the altar was bleſſed by the miniſters of religion; his ſolemn reception was preceded by faſts and vigils; and he was created a knight in the name of God, of St George, and of St Michael the archangel He ſwore to accompliſh the duties of his profeſſion: and education, example, and the public opinion, were the inviolable guardians of his oath. As the champion of God and the ladies, he devoted himſelf to ſpeak the truth; to maintain the right; to protect the diſtreſſed; to practiſe *courteſy*, a virtue leſs familiar to the ancients; to purſue the infidels; to deſpiſe the allurements of eaſe and ſafety; and to vindicate in every perilous adventure the honour of his character. The abuſe of the ſame ſpirit provoked the illiterate knight to diſdain the arts of induſtry and peace; to eſteem himſelf the ſole judge and avenger of his own injuries; and proudly to neglect the laws of civil ſociety and military diſcipline. Yet the benefits of this inſtitution, to refine the temper of barbarians, and to infuſe ſome principles, of faith, juſtice, and humanity, were

ſtrongly

ſtrongly felt, and have been often obſerved. The aſperity of national prejudice was ſoftened; and the community of religion and arms ſpread a ſimilar colour and generous emulation over the face of Chriſtendom. Abroad, in enterpriſe and pilgrimage; at home, in martial exerciſe, the warriors of every country were perpetually aſſociated; and impartial taſte muſt prefer a Gothic tournament to the Olympic games of claſſic antiquity. Inſtead of the naked ſpectacles which corrupted the manners of the Greeks, and baniſhed from the ſtadium the virgins and matrons, the pompous decoration of the liſts was crowned with the preſence of chaſte and high born beauty, from whoſe hands the conqueror received the prize of his dexterity and courage. The ſkill and ſtrength that were exerted in wreſtling and boxing, bear a diſtant and doubtful relation to the merit of a ſoldier, but the tournaments, as they were invented in France, and eagerly adopted both in the eaſt and weſt, preſented a lively image of the buſineſs of the field. The ſingle combats, the general ſkirmiſh, the defence of a paſs or caſtle, were rehearſed as in actual ſervice; and the conteſt, both in real and mimic war, was decided by the ſuperior management of the horſe and lance. The lance was the proper and peculiar weapon of the knight: his horſe was of large and heavy breed; but this charger, till he was rouſed by the approaching danger, was uſually led by an attendant, and he quietly rode a pad or palfrey of a more eaſy pace. His helmet and ſword, his greaves and buckler, it would be ſuperfluous to deſcribe; but I may remark, that at the period of the cruſades, the armour was leſs ponderous than in later times; and that, inſtead of a maſſy cuiraſs, his breaſt was defended by an hauberk or coat of mail. When their long lances were fixed in the reſt, the warriors furiouſly ſpurred their horſes againſt the foe; and the light cavalry of the Turks and Arabs could ſeldom ſtand againſt the direct and impetuous weight of their charge. Each knight was attended to the field by his faithful ſquire, a youth of equal birth and ſimilar hopes; he was followed by his archers and men at arms; and 4, 5, or 6 ſoldiers, were computed as the furniture of a complete *lance*. In the expeditions to the neighbouring kingdoms or the Holy Land, the duties of the feudal tenure no longer ſubſiſted; the voluntary ſervice of the knights and their followers was either prompted by zeal or attachment, or purchaſed with rewards and promiſes; and the numbers of each ſquadron were meaſured by the power, the wealth, and the fame of each independent chieftain. They were diſtinguiſhed by his banner, his armorial coat, and his cry of war; and the moſt ancient famillies of Europe muſt ſeek in theſe atchievements the origin and proof of their nobility."

(6.) Chivalry, court of, a court formerly held before the lord high conſtable and earl marſhal of England jointly, and having both civil and criminal juriſdiction; but ſince the attainder of Stafford Duke of Buckingham under Henry VIII. and the conſequent extinction of the office of lord high conſtable, it has uſually, with reſpect to civil matters, been heard before the earl marſhal only. This court, by ſtat. 13. Rich. II. c. 2. has cognizance of contracts and other matters touching deeds of arms and war, as well out of the realm is in it. And from its ſentence lies an immediate appeal to the king in perſon. This court was in great repute in the times of pure chivalry, and afterwards during the Engliſh connections with the continent, by the territories which their princes held in France; but is almoſt entirely out of uſe, on account of the feebleneſs of its juriſdiction and want of power to enforce its judgements; as it can neither fine nor impriſon, not being a court of record. Its *civil* juriſdiction conſiſted principally in two points; the redreſſing injuries of honour, and correcting encroachments in matters of coat armour, precedency, and other diſtinctions of famillies. As a court of *honour*, it was to give ſatisfaction to all ſuch as were aggrieved, in any point, of a nature ſo nice and delicate, that it eſcaped the notice of the common law; ſuch, for inſtance, as calling a man a *coward*, or *giving him the lie*; &c.

CHIVAS, or Chivazzo, a ſtrong town of Piedmont, ſituated in a plain near the union of the Doria and the Po. It is defended with walls, baſtions, and large foſſes filled with water; it is well ſupplied with artillery and a numerous garriſon, eſpecially in the time of war. The ſituation is ſo advantageous that whoever are maſters of this town are ſaid to poſſeſs the key of the country of Turin, the Canavois, the country of Vercelli, Montferrat, and Lombardy. It has ſeveral churches and convents. It was taken by the French in 1705, and afterwards retaken by the allies; and in 1798 it ſurrendered to the French republicans, though the garriſon conſiſted of 800 men. It lies 11 miles NE. of Turin, and 12 S. of Ivrea. Lon. 25. 29. E. Ferro. Lat. 45. 1. N.

(1.) * CHIVES. *n. ſ.* [*cive*, Fr. *Skinner*.] 1. The threads or filaments riſing in flowers, with ſeeds at the end.—The maſculine or prolifick ſeed contained in the *chives*, or apices of the ſtamina. *Ray*. 2. A ſpecies of ſmall onion. *Skinner*.

(2.) Chives. See Botany, *Index*.

CHIUM marmor, *Chian Marble*, in the natural hiſtory of the ancients, the name of a black marble, called alſo the *lapis obſidianus*. It is very hard, and of a fine black, and, beſide the many uſes to which the ancients put it, is well known among goldſmiths by the name of the *touchſtone*; moſt of them being furniſhed with nothing better for this purpoſe than a piece of this: though the baſaltes is greatly preferable for thoſe uſes; and black marble, however, that is tolerably hard, will do. This is a very fine and elegantly ſmooth marble, of a compact texture, and fine gloſſy black, but ſhowing no glittering particles when freſh broken, as moſt of the black marble. The ancients had it from Ethiopia and the iſland of Chios; we have it from Italy.

Chium vinum, *Chian Wine*, or wine of the growth of the iſland of Chios is commended by Dioſcorides as affording good nouriſhment, fit to drink, leſs diſpoſed to intoxicate, endued with the virtue of reſtraining defluxions, and a proper ingredient in opthalmic medicines. Hence Scribonus Largus directs the dry ingredients in collyria for the eyes to be made up with Chian wine.

CHIUN, or Chevan, in Hebrew antiquity.

We meet with this word in the book of Amos, cited in the Acts of the apoſtles, St Luke has the paſſage thus: "Ye took up the tabernacle of Moloch and the ſtar of your god Remphan, figures which ye made to worſhip them." The import of the Hebrew is as follows: "Ye have borne the tabernacle of your kings, and the pedeſtal, the *chium*, of your images, the ſtar of your gods, which ye made to yourſelves." The Septuagint in all probability read *Repham* or *Revan*, inſtead of *Chium* or *Chevan*, and took the pedeſtal for a god. Some ſay that the LXX, who made their tranſlation in Egypt, changed the word *Chium* into that of *Remphan* becauſe they had the ſame ſignification. M. Baſnage, in his *Jewiſh Antiquities*, after a good deal upon *Chion* or *Remphan*, concludes that Moloch was the ſun, and *Chion*, *Chium*, or *Remphan*, the moon.

CHIUSI, a city of Italy, in Tuſcany, anciently called Clusium, and one of the 12 ancient cities of Etruria. It is the ſee of a biſhop, but being unhealthy, is not populous. It lies 35 miles SE. of Sienna. Lon. 10. 52. E. Lat. 43. 2. N.

CHIUSTENGI, a town of European Turkey, in Bulgaria, ſeated on the Black Sea, and formerly very powerful. Lon. 27. 30. E. Lat. 43. 2. N.

CHIUTAYE, a conſiderable town of Aſiatic Turkey, the capital of Natolia Proper, ſituated at the foot of a mountain, in a fertile and healthy country, defended by a caſtle built on a rock. It contains ſeveral moſques, and three Armenian churches. It was the reſidence of the Grand Signior before the taking of Conſtantinople. Lon. 30. 47. E. Lat. 39. 30. N.

CHLAMYS, in antiquity, a military habit worn by the ancients over the tunica. It belonged to the patricians, and was the ſame in the time of war that the toga was in the time of peace. This ſort of gown was called *picta* from the rich embroidery with figures in Phrygian work; and *purpurea*, becauſe the ground-work was purple. The chlamydes of the emperors, were all purple, adorned with a golden embroidered border.

CHLOEIA, in antiquity, a feſtival celebrated at Athens in honour of Ceres, to whom under the name χλοη, *i. e. Graſs*, they ſacrificed a ram.

CHLORA, in botany, a genus of the monogynia order, belonging to the octandria claſs of plants. The calyx is octophyllous, the corolla monopet and octofid; the capſule unilocular, bivalved, and polyſpermous.

(1.) * CHLOROSIS. *n. ſ.* [from χλωρὸς, green.] The green-ſickneſs.

(2.) Chlorosis. See Medicine, *Index*.

* *To* CHOAK. See Choke.

CHOASPES, in ancient geography, a river in the N. of Perſia, which, after paſſing Suſa, falls into the gulph of Baſſora. It is ſuppoſed to be the Ulai mentioned by Daniel, Chap. viii. 2. Its water is ſaid to have been ſo excellent, that the Perſian monarchs drank of it, and had it always carried along with them, when they travelled.

(1.) * CHOCOLATE. *n. ſ.* [*chocolate*, Span.] 1. The nut of the cacao tree.—The tree hath a roſe flower, of a great number of petals, from whoſe empalement ariſes the pointal, being a tube cut into many parts, which becomes a fruit ſhaped ſomewhat like a cucumber, and deeply furrowed, in which are contained ſeveral ſeeds, collected into an oblong heap, and ſlit down, ſomewhat like almonds. It is a native of America, and is found in great plenty in ſeveral places between the Tropicks, and grows wild. See Cocoa. *Miller*. 2. The cake or maſs, made by grinding the kernel of the cacao-nut with other ſubſtances, to be diſſolved in hot water.—The Spaniards were the firſt who brought *chocolate* into uſe in Europe, to promote the conſumption of their cacao-nuts, achiot, and other drugs, which their Weſt Indies furniſh, and which enter the compoſition of *chocolate*. *Chambers*. 3. The liquor, made by a ſolution of chocolate in hot water.—*Chocolate* is certainly much the beſt of theſe three exotick liquours: its oil ſeems to be both rich, alimentary, and anodyne. *Arbuthnot*.

(2.) * Chocolate-house. *n. ſ.* [*chocolate* and *houſe*.] A houſe where company is entertained with chocolate.--Ever ſince that time, Lyſander has been twice a day at the *chocolate-houſe*. *Tatler*.

(3.) Chocolate, methods of making. The Indians, in their firſt making of chocolate, uſed to roaſt the cacao in earthen pots; and having afterwards cleared it of the huſks, and bruiſed it between two ſtones, they made it into cakes with their hands. The Spaniards improved this method: when the cacoa is properly roaſted and well cleaned, they pound it in a mortar, to reduce it into a coarſe maſs, which they afterwards grind on a ſtone till it be of the utmoſt fineneſs: the paſte being ſufficiently ground, is put quite hot into tin moulds, in which it congeals in a very little time. The form of theſe moulds is arbitrary: the cylindrical ones, holding 2 or 3 lb. are the moſt proper; becauſe the bigger the cakes are, the longer they will keep These cakes are very liable to take any good or bad ſcent, and therefore they muſt be carefully wrapt up in paper, and kept in a dry place. Complaints are made that the Spaniards mix with the cacao nuts too great a quantity of cloves and cinnamon beſides other drugs without number, as muſk, ambergreaſe, &c. The grocers of Paris uſe few or none of theſe ingredients; they only chooſe the beſt nuts, which are called caracca, from the place from whence they are brought; and with theſe they mix a very ſmall quantity of cinnamon, the freſheſt vanilla, and the fineſt ſugar, but very ſeldom any cloves. In England, the chocolate is made of the ſimple cacao, excepting that ſometimes ſugar, and ſometimes vanilla is added. The chocolate made in Portugal and Spain is not near ſo well prepared as the Engliſh, depending perhaps on the machine employed there. *viz.* the double cylinder, which ſeems very well calculated for exact triture. If perfectly prepared, no oil appears on the ſolution. London chocolate gives up no oil like the foreign; and it alſo may, in ſome meaſure, depend on the thickneſs of the preparation. The ſolution requires more care than is commonly imagined. It it proper to break it down, and diſſolve it thoroughly in cold water, by milling it with the chocolate ſtick. If heat is applied, it ſhould be done ſlowly: for if ſuddenly, the heat will not only coagulate it, but ſeparate the oil; and therefore much boiling after it is diſſolved, is hurtful. Chocolate is commonly required by people of weak ſtomachs; but often rejected for want of proper preparation. When properly prepared, it is eaſily diſſolved; and an excellent food where a liquid nutrient vegetable one is required. It is leſs flatulent than any of the farinacea.

(4.) CHOCOLATE NUT TREE. See THEOBROMA.

(5.) CHOCOLATE, PHÆNOMENON OF FRESH MADE. Mr Henly, an ingenious electrician, has lately diſcovered that chocolate, freſh from the mill, as it cools in the tin-pans into which it is received, becomes ſtrongly electrical; and that it retains this property for ſome time after it has been turned out of the pans, but ſoon loſes it by handling. The power may be once or twice renewed by melting it again in an iron ladle, and pouring it into the tin pans as at firſt; but when it becomes dry and powdery, the powder is not capable of being revived by ſimple melting: but if a ſmall quantity of olive oil be added, and well mixed with the chocolate in the ladle, its electricity will be completely reſtored by cooling it in the tin pan as before. From this experiment he conjectures; that there is a great affinity between phlogiſton and the electric fluid, if indeed they be not the ſame thing.

(6.) CHOCOLATE, STATUTES RESPECTING. Chocolate ready made, and cacao paſte, are prohibited to be imported from any part beyond the ſeas. If made and ſold in Great Britain, it pays inland duty 1s 6d *per lb.* avoirdupoiſe: it muſt be incloſed in papers containing 1 lb. each, and produced at the exciſe-office to be ſtamped. Upon 3 days notice given to the officer of exciſe, private families may make chocolate for their own uſe, provided no leſs than half a cwt. of nuts be made at one time.

CHOCZIM, or } a town of Moldavia, ſeated
CHOCZIN, } on the Dnieſter, near Poland. It was taken by the Ruſſians and Auſtrians in 1788, from the Turks, but reſtored at the ſubſequent peace. It lies 110 miles NW. of Jaſſy. Lon. 26. 25. E. Lat. 48. 46. N.

* CHODE. [the old preterite, from *chide*.] See CHIDE.—And Jacob was wroth, and *chode* with Laban. *Gen.*

CHOENIX, χοινιξ, an ancient dry meaſure, containing the 48th part of a *medimnus*, or ſix buſhels.

(1.) CHŒRILUS, a hiſtorian of Samos. See CHERILUS.

(2.) CHOERILUS, a poet who flattered Alexander the Great, and undertook to write a poem on his exploits.

(3.) CHOERILUS, a tragic poet of Athens who lived about the 6th olympiad. He wrote 150 tragedies, of which 13 had obtained the prize.

CHŒRINÆ, in antiquity, a kind of ſea-ſhells, with which the ancient Greeks uſed to give their ſuffrage, or vote.

(1.) * CHOICE. *adj.* [*choiſi*, Fr.] 1. Select; of extraordinary value.—After having ſet before the king the *choiceſt* of wines and fruits, he told him the beſt part of his entertainment was to come. *Guardian.* 2. Chary; frugal; careful. Uſed of perſons.—He that is *choice* of his time, will alſo be *choice* of his company, and *choice* of his actions. *Taylor.*

(2.) * CHOICE. *n. ſ.* [*choix*, Fr.] 1. The act of chooſing; determination between different things propoſed; election.—

If you oblige me ſuddenly to chuſe,
The *choice* is made; for I muſt both refuſe. *Dryd.*

2. The power of chooſing; election.—*Choice* there is not, unleſs the thing which we take be ſo in our power, that we might have refuſed it. If fire conſume the ſtable, it chooſeth not ſo to do, becauſe the nature thereof is ſuch that it can do no other. *Hooker.*—There's no liberty like the freedom of having it at my own *choice*, whether I will live to the world or to myſelf. *L'Eſtrange.* 3. Care in chooſing; curioſity of diſtinction.—Julius Cæſar did write a collection of apophthegms; it is pity his book is loſt; for I imagine they were collected with judgment and *choice*. *Bacon.* 4. The thing choſen; the thing taken or approved, in preference to others.—

Your *choice* is not ſo rich in birth as beauty:
That you might well enjoy her. *Shakeſp.*

5. The beſt part of any thing, that is more properly the object of choice.—The *choice* and flower of all things profitable in other books, the pſalms do both more briefly contain, and more movingly alſo expreſs. *Hooker.*—Thou art a mighty prince: in the *choice* of our ſepulchres bury thy dead. *Gen.* 6. Several things propoſed at once, as objects of judgment and election.—

A braver choice of dauntleſs ſpirits,
Did never float upon the ſwelling tide. *Shakeſp.*

7. *To make* CHOICE *of.* To chooſe; to take from ſeveral things propoſed.—

Wiſdom, of what herſelf approves, *makes choice*,
Nor is led captive by the common voice. *Denh.*

* CHOICELESS. *adj.* [from *choice*.] Without the power of chooſing; without right of choice; not free.—Neither the weight of the matter of which the cylinder is made, nor the round voluble form of it, are any more imputable to that dead *choiceleſs* creature, than the firſt motion of it; and, therefore, it cannot be a fit reſemblance to ſhew the reconcileableneſs of fate with choice. *Hamm.*

* CHOICELY. *adv.* [from *choice*.] 1. Curiouſly; with exact choice.—

A band of men,
Collected *choicely* from each county ſome. *Shak.*

2. Valuably; excellently.—

It is certain it is *choicely* good. *Walton's Angler.*

* CHOICENESS. *n. ſ.* [from *choice*.] Nicety; particular value.—Carry into the ſhade ſuch auriculas, ſeedlings or plants, as are for their *choiceneſs* reſerved in pots. *Evelyn's Kalendar.*

(1.) * CHOIR. *n. ſ.* [*chorus*, Lat.] 1. An aſſembly or band of ſingers.—

They now aſſiſt their *choir*
Of angels, who their ſongs admire. *Waller.*

2. The ſingers in divine worſhip.—

The *choir*,
With all the choiceſt muſick of the kingdom,
Together ſung *Te Deum.* *Shakeſpeare.*

3. The part of the church where the choriſters or ſingers are placed.—

The lords and ladies, having brought the queen
To a prepar'd place in the *choir*, fell off
At diſtance from her. *Shakeſpeare.*

(2.) *The* CHOIR (§ 1. *def.* 3.) is ſeparated from the chancel where the communion is celebrated, and from the nave of the church where the people are placed: the patron is ſaid to be obliged to repair the choir of the church. It was in the time of Conſtantine that the choir was ſeparated from the nave. In the 12th century, they began to encloſe it with walls; but the ancient baluſtrades have been ſince reſtored, out of a view to the beauty of architecture.

(3.) Choir, in nunneries, is a large hall adjoining to the body of the church, ſeparated by a grate, where the nuns ſing the office.

CHOISI, Francis Timoleon de, dean of the cathedral of Bayeux, and one of the 40 of the French academy, was born at Paris in 1644. In 1685, he was ſent with the chevalier de Chaumont to the king of Siam, and was ordained prieſt in the Indies by the apoſtolical vicar. He wrote a great number of works, in a polite, florid, and eaſy ſtyle; the principal of which are, 1. Four dialogues on the Immortality of the Soul, &c. 2. Account of a voyage to Siam. 3. An Eccleſiaſtical Hiſtory, in 11 vol. 4to. 4. Life of David, with an interpretation of the Pſalms. 5. Life of Solomon, &c. He died at Paris in 1724.

* CHOKE. *n.ſ.* [from the verb.] The filamentous or capillary part of an artichoke. A cant word.

* *To* Choke. *v. a.* [*aceocan*, Sax. from *ceoca*, the *cheek* or *mouth*. According to *Minſhew*, from חנק; from whence, probably, the Spaniſh, *ahogar*.] 1. To ſuffocate; to kill by ſtopping the paſſage of reſpiration.—

But when to my good lord I prove untrue,
I'll *choke* myſelf. *Shakeſpeare.*

2. To ſtop up; to obſtruct; to block up a paſſage.—They are at a continual expence to cleanſe the ports, and keep them from being *choked* up, by the help of ſeveral engines. *Addiſon on Italy.* 3. To hinder by obſtruction, or confinement.—

As two ſpent ſwimmers, that do cling together,
And *choke* their art. *Shakeſpeare.*

4. To ſuppreſs.

And yet we ventur'd; for the gain propos'd
Chok'd the reſpect of likely peril fear'd. *Shakeſp.*

5. To overpower.—And that which fell among thorns are they, which, when they have heard, go forth, and are *choked* with cares, and riches, and pleaſures of this life, and bring no fruit to perfection. *Locke.*

* CHOKE-PEAR. *n.ſ.* [from *choke* and *pear.*] 1. A rough, harſh, unpalatable pear. 2. Any aſperſion or ſarcaſm, by which another is put to ſilence. A low term.—Pardon me for going ſo low as to talk of giving *choke-pears*. *Clariſſa.*

* *A* CHOKER. *n.ſ.* [from *choke.*] 1. One that chokes or ſuffocates another. 2. One that puts another to ſilence. 3. Any thing that cannot be anſwered.

* CHOKE-WEED. *n.ſ.* [*ervangina.*] A plant.

* CHOLAGOGUES. *n.ſ.* [χολος, *bile.*] Medicines which have the power of purging bile or choler.

CHOLEDOCHUS, [from χολη, choler, and δεχομαι, to contain,] in anatomy, a term applied to a canal, or duct, called alſo *ductus communis*; formed of the union of the porus bilarius and ductus cyſticus. Paſſing obliquely to the lower end of the duodenum, it ſerves to convey the bile from the liver to the inteſtines. See Anatomy, § 300.

(1.) * CHOLER. *n.ſ.* [*cholera*, Lat. from χολη.] 1. The bile.—There would be a main defect, if ſuch a feeding animal, and ſo ſubject unto diſeaſes from bilious cauſes, ſhould want a proper conveyance for *choler*. *Brown.* 2. The humour, which, by its ſuper-abundance, is ſuppoſed to produce iraſcibility. 3. Anger; rage.—

Put him to *choler* ſtraight: he hath been uſed
Ever to conquer, and to have his word
Of contradiction. *Shakeſp.*

(2.) Choler. See Bile, § 1. and Gall.

CHOLERA morbus, a ſudden eruption or overflowing of the bile or bilious matters both upwards and downwards. See Medicine, *Index*.

* CHOLERICK. *adj.* [*cholericus*, Lat.] 1. Abounding with choler.—Our two great poets being ſo different in their tempers, the one *cholerick* and ſanguine, the other phlegmatick and melancholick. *Dryden.* 2. Angry; iraſcible: of perſons.—Bull, in the main, was an honeſt plaindealing fellow, *cholerick*, bold, and of a very unconſtant temper. *Arbuthnot.* 3. Angry; offenſive: of words or actions.—There came in *cholerick* haſte towards me about ſeven or eight knights. *Sidney.*

* CHOLERICKNESS. *n.ſ.* [from *cholerick.*] Anger; iraſcibility: peeviſhneſs.

CHOLET, a town of France, in the department of Maine and Loire, and ci-devant province of Anjou, with a caſtle, 170 miles SW. of Paris. Lon. 0. 45. W. Lat. 47. 10. N.

CHOLMOGORY, a town of European Ruſſia, ſeated on an iſland in the Dwina, under the government of Archangel, 28 miles S. of Archangel, and 360 NE. of Peterſburgh.

CHOLOBAPHIS, in ancient mineralogy, a kind of emerald inclining to yellow.

CHOMER, or Omer. See Corus.

(1.) CHONAT, a county of Hungary.

(2.) Chonat, an epiſcopal town in the above county, ſeated on the Merich, 25 miles E. of Segeden. Lon. 21. 4. E. Lat. 46. 20. N.

CHONDRILLA, in botany, a genus of the polygamia equalis order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The receptacle is naked; the calyx calyculated; the pappus ſimple and ſtalked; the florets in a manifold ſeries.

CHONDROPTERYGII, in ichthyology, a term formerly applied to the order of fiſhes now called *amphibia nantes* by Linnæus. See Amphibia.

CHONDROS, the ſame with Alica.

CHONDROSYNDESMUS, in ancient medical writings, a cartilaginous ligament.

(1.) * *To* CHOOSE. *v. a.* I choſe, I have choſen or choſe. [*choiſir*, Fr. *ceoſan*, Sax. *kieſen*, Germ.] 1. To take by way of preference of ſeveral things offered; not to reject.—Did I *chooſe* him out of all the tribes of Iſrael to be my prieſt. 1 *Sam.* ii. 28.—I may neither chooſe whom I would, nor refuſe whom I diſlike. *Shakeſp.* 2. To take; not to refuſe.—Let us *chooſe* to us judgment; let us know among ourſelves what is good. *Job.*—The will has ſtill ſo much freedom left as to enable it to *chooſe* any act in its kind good; as alſo to refuſe any act in its kind evil. *South.* 3. To ſelect; to pick out of a number.—How much leſs ſhall I anſwer him, and *chooſe* out my words to reaſon with him? *Job.*

4. To elect for eternal happineſs; to predeſtinate to life. A term of theologians.

(2.) * *To* **Choose**. *v. n.* To have the power of choice between different things. It is generally joined with a negative, and ſignifies muſt neceſſarily be.—Without the influence of the Deity ſupporting things, their utter annihilation could not *chooſe* but follow. *Hooker.*—When a favourite ſhall be raiſed upon the foundation of merit, then can he not *chooſe* but proſper. *Bacon.*

* **CHOOSER.** *n. ſ.* [from *chooſe*.] He that has the power or office of chooſing; elector.—In all things to deal with other men, as if I might be my own *chooſer*. *Hammond.*

* **CHOP.** *n. ſ.* [from the verb.] 1. A piece chopped off. See **Chip**.—Sir William Capel compounded for ſixteen hundred pounds, yet Empſon would have cut another *chop* out of him, if the king had not died. *Bacon.* 2. A ſmall piece of meat, commonly of mutton.—

Old Croſs condemns all perſons to be fops,
That can't regale themſelves with mutton *chops*.
King's Cook.

3. A crack, or cleft.—Water will make wood to ſwell; as we ſee in the filling of the *chops* of bowls, by laying them in water. *Bacon.*

(1.) * *To* **Chop**. *v. a.* [*ceapan*, Sax. *koopen*, Dut. to buy.] 1. To purchaſe, generally by way of truck; to give one thing for another.—The *chopping* of bargains, when a man buys, not to hold, but to ſell again, grindeth upon the ſeller and the buyer. *Bacon.* 2. To put any thing in the place of another.—We go on *chopping* and changing our friends, as well as our horſes. *L'Eſtrange.* 3. To bandy; to altercate; to turn one thing or word for another.—Let not the council at the bar *chop* with the judge, nor wind himſelf into the handling of the cauſe a-new, after the judge hath declared his ſentence. *Bacon.*

(2.) * *To* **Chop**. *v. a.* [*kappan*, Dut. *couper*, Fr.] 1. To cut with a quick blow.—

What ſhall we do, if we perceive
Lord Haſtings will not yield to our complots?
———*Chop* off his head, man. *Shak.*

2. To devour eagerly: with *up*.—You are making a haſty meal, and for *chopping up* your entertainment, like an hungry clown. *Dryden.* 3. To mince; to cut into ſmall pieces.—They break their bones, and *chop* them in pieces, as for the pot. *Micah.* 4. To break into chinks.—I remember the cow's dugs, that her pretty *chopt* hands had milked. *Shak.*

(3.) * *To* **Chop**. *v. n.* 1. To do any thing with a quick and unexpected motion, like that of a blow: as we ſay, the wind *chops* about, that is, changes ſuddenly.—If the body repercuſſing be near, and yet not ſo near as to make a concurrent echo, it *choppeth* with you upon the ſudden. *Bacon.* 2. To catch with the mouth.—Out of greedineſs to get both, he *chops* at the ſhadow, and loſes the ſubſtance. *L'Eſtrange.* 3. To light or happen upon a thing ſuddenly: with *upon*.

CHOP-CHURCH, or **Church-chopper**, a name, or rather nick-name, given to parſons who make a practice of exchanging benefices. See **Permutation**. *Chop-church* is mentioned in an ancient ſtatute as a lawful trade or occupation. Brook holds that it was no occupation, but only permiſſible by law.

* **CHOP-HOUSE.** *n. ſ.* [from *chop* and *houſe*.] A mean houſe of entertainment, where proviſion ready dreſſed is ſold.—I loſt my place at the *chop-houſe*, where every man eats in publick a meſs of broth, or *chop* of meat, in ſilence. *Spect.*

(1.) * **CHOPIN.** *n. ſ.* [Fr.] 1. A French liquid meaſure, containing nearly a pint of Wincheſter. 2. A term uſed in Scotland for a quart, of wine meaſure.

(2.) **Chopin.** See **Measure**, and **Pint**.

(3.) **Chopin**, Rene, a famous civilian born at Baileul in Anjou in 1537. He was advocate in the parliament of Paris, where he pleaded for a long time with great reputation. He at laſt ſhut himſelf up in his cloſet; and compoſed many works, which have been collected, and printed in 6 volumes folio. He died at Paris in 1606.

* **CHOPPING.** *particip. adj.* [In this ſenſe, of uncertain etymology.] An epithet frequently applied to infants, by way of ludicrous commendation: imagined by *Skinner* to ſignify *luſty*, from *cas*, Sax. by others to mean a child that would bring money at a market. Perhaps a greedy, hungry child, likely to live.—

Both Jack Freeman and Ned Wild,
Would own the fair and *chopping* child. *Fenton.*

* **CHOPPING-BLOCK.** *n. ſ.* [*chop* and *block*.] A log of wood, on which any thing is laid to be cut on pieces.—The ſtrait ſmooth elms are good for axle-trees, boards, *chopping-blocks*. *Mortimer.*

* **CHOPPING-KNIFE.** *n. ſ.* [*chop* and *knife*.] A knife with which cooks mince their meat.—Here comes Dametas, with a ſword by his ſide, a foreſt bill on his neck, and a *chopping-knife* under his girdle. *Sidney.*

* **CHOPS.** *n. ſ.* without a ſingular. [corrupted probably from **Chaps**, which ſee.] 1. The mouth of a beaſt.—So ſoon as my *chops* begin to walk, yours muſt be walking too, for company. *L'Eſtr.* 2. The mouth of a man, uſed in contempt.—

He ne'er ſhook hands, nor bid farewel to him,
'Till he unſeam'd him from the nape to th' *chops*.
Shak.

3. The mouth of any thing in familiar language; as of a river; of a ſmith's vice.

CHOPTANK, a large navigable river of the United States, which riſes in Kent county, in the ſtate of Delaware, and after running SSW. for about 43 miles, through the Eaſtern Shore of Maryland, it turns ſuddenly WNW. and falls into the Cheſapeak between Cook's Point and Tilghman's Iſland.

CHORAGIUM, in antiquity, 1. the funeral of a young unmarried woman: 2. the dreſſing room of the ſtage.

CHORAGUS, in the ancient theatres, an officer who ſuper-intended the chorus.

(1.) * **CHORAL.** *adj.* [from *chorus*, Lat.] 1. Belonging to or compoſing a choir or concert.—

All ſounds on fret by ſtring or golden wire
Temper'd ſoft tunings intermix'd with voice,
Choral or uniſon. *Milton.*

2. Singing in a choir.—

And *choral* ſeraphs ſung the ſecond day.
Amhurſt.

(2.) **Choral,** *n. ſ.* a perſon who, by virtue of the orders of the clergy, was in ancient times admitted to ſit and ſerve in the choir.

CHORÁSAN, or **CHORASSAN,** or Khorassan, the ancient Bactria, a province of Perſia; bounded on the N. by Charaſm and the country of the Uſbec Tartars; on the E. by Bukharia and Candahar; on the S. by Segeſtan; and, on the W. by the province of Mezanderan and the Caſpian ſea; about 150 leagues in length, and 140 in breadth. The principal towns are Herat, Kenef, Talekan, Mereva, Zaweh, &c. Kouli-Khan was born in this province.

CHORAX, or Charax, a city of Characene, in Perſia, called alſo Alexandria, from Alexander the Great; afterwards *Antiochia*, from Antiochus V. king of Syria; and laſtly *Chorax Spaſinæ* or *Paſinæ*, *i. e.* the Mole of the Spalines; an Arabian king of that name having ſecured it againſt the overflowing of the Tigris, by a mole extending 3 miles, which ſerves as a fence to the whole country.

CHORAZIM, or **CHORAZIN,** a town of Galilee: the infidelity of whoſe inhabitants was lamented by our Saviour. It is 2 miles diſtant from Capernaum, and is now deſolate.

(I.) * **CHORD.** *n. ſ.* [*chorda*, Lat. When it ſignifies a rope or ſtring in general, it is written *cord*: when its primitive ſignification is preſerved, the *h* is retained.] 1. The ſtring of a muſical inſtrument.

> Who mov'd
> Their ſtops and *chords*, was ſeen; his volant touch
> Inſtinct thro' all proportions, low and high,
> Fled and purſu'd tranſverſe the reſonant fugue.
> *Milton.*

2. [In geometry.] A right line, which joins the two ends of any arch of a circle.

(II.) **Chord,** in muſic, the union of two or more ſounds uttered at the ſame time, and forming together an entire harmony. The natural harmony produced by the reſonance of a ſounding body, is compoſed of three different ſounds, without reckoning their octaves; which form among themſelves the moſt agreeable and perfect chord that can poſſibly be heard: for which reaſon they are called, on account of their excellence, *perfect chords*. Hence, in order to render that harmony complete, it is neceſſary that each chord ſhould at leaſt conſiſt of three ſounds. The trio is likewiſe found by muſicians to include the perfection of harmony; whether becauſe in this all the chords, and each in its full perfection, are uſed; or becauſe upon ſuch occaſions as render it improper to uſe them all, and each in its integrity, arts have been ſucceſsfully practiſed to deceive the ear, and give it contrary perſuaſion, by deluding it with the principal ſounds of each *chord*, in ſuch a manner as to render it forgetful of the other ſounds neceſſary to their completion. Yet the octave of the principal ſound produces new relations, and new conſonances, by the completion of the intervals: they commonly add this octave, to have the aſſemblage of all the conſonances in one and the ſame *chord*; See Consonance. And the addition of the diſſonance, (ſee Discord,) producing a 4th ſound ſuperadded to the perfect chord, it becomes indiſpenſably neceſſary, to render the chord full, that we ſhould include a fourth part to expreſs this diſſonance. Thus, the ſeries of chords can neither be complete nor connected but by means of four parts. *Chords* are divided into perfect and imperfect, or more properly, *direct* and *reverſed*.

1. **Chord, direct, or perfect,** is that which is compoſed of the fundamental ſound below, of its third, its fifth, and its octave: they are likewiſe ſubdivided into major and minor, according as the thirds which enter into their compoſition are flat or ſharp: See Interval. Some authors likewiſe give the name of *perfect* to all chords, even to diſſonances, whoſe fundamental ſounds are below.

2. **Chord, imperfect, or reversed,** is that in which the ſixth, inſtead of the fifth, prevails, and in general all thoſe whoſe loweſt are not their fundamental ſounds.

(III.) **Chords** are alſo divided into conſonances and diſſonances. The chords denominated *conſonances*, are the perfect chord, and its derivatives: every other chord is a *diſſonance*. A table of both, according to the ſyſtem of M. Rameau, may be ſeen in Rouſſeau's Muſical Dictionary, vol. i. p. 27. After this table, he adds the following judicious and important obſervations. 1. "It is a capital error to imagine, that the methods of inverting the ſame chord are in all caſes equally eligible for the harmony and for the expreſſion. There is not one of theſe different arrangements but had its proper character. Every one feels the contraſt between the ſoftneſs of the falſe 5th, and the grating ſound of the tritone, though the one of theſe intervals is produced by a method of inverting the other. With the 7th diminiſhed, and the 2d redundant, the caſe is the ſame with the interval of the 2d in general uſe, and the 7th. Who does not feel how much more vocal and ſonorous the 5th appears when compared with the 4th? The *chord* of the great 6th, and that of the leſſer 6th minor, are two forms of the ſame fundamental *chord*: but how much leſs is the one harmonious than the other? On the contrary, the *chord* of the leſſer 6th major is much more pleaſing and cheerful than that of the falſe 5th. And only to mention the moſt ſimple of all *chords*, reflect on the majeſty of the perfect chord, the ſweetneſs of that which is called the chord of the 6th, and the inſipidity of that which is compoſed of a 6th and a 4th; all of them, however, compoſed of the ſame ſounds. In general, the redundant intervals, the ſharps in the higher part, are proper by their ſeverity to expreſs violent emotions of mind, ſuch as anger and the rougher paſſions. On the contrary, flats in the higher parts, and diminiſhed intervals, form a plaintive harmony which melts the heart. There are a multitude of ſimilar obſervations, of which when a muſician knows how to avail himſelf, he may command at will the affections of thoſe who hear him. 2. The choice of ſimple intervals is ſcarcely of leſs importance than that of the *chords*, with regard to the ſtations in which they ought to be placed. It is, for inſtance, in the lower parts that the 5th and octave ſhould be uſed in preference; in the upper parts, the 3d and 6th are more proper. If you tranſpoſe this order, the harmony will be ruined even though the ſame *chords* are preſerved. 3. In a word, the *chords* are rendered ſtill more harmonious, by being approximated and only divided by the ſmalleſt practicable intervals, which are more ſuitable to the capacity of the ear than ſuch as are remote. This is what we call *contracting* the harmony, an art which few compoſers have ſkill and abilities enough to put in practice. The limits in the natural compaſs of voices, afford an additional reaſon for leſſening the diſtance of the intervals, which compoſe the harmony of the chorus, as much as poſſible. We may affirm, that a chorus is improperly compoſed, when the diſtance between the *chords* increaſes; when thoſe who perform the different parts are obliged to ſcream; when the voices riſe above their natural extent, and are ſo remotely diſtant one from the other that the perception of harmonical relations between them is loſt. We ſay likewiſe, that an inſtrument is in *concord* when the intervals between its fixed ſounds are what they ought to be; we ſay in this ſenſe, that the *chords* of an inſtrument are true or falſe, that it preſerves or does not preſerve its *chords*. The ſame form of ſpeaking is uſed for two voices which ſing together, or for two ſounds which are heard at the ſame time, whether in uniſon or in parts."

(IV.) Chords, or cords, of musical instruments, are ſtrings, by the vibration of which the ſenſation of ſound is excited, and by the diviſions of which the ſeveral degrees of tone are determined.

* *To* Chord. *v. a.* [from the noun,] To furniſh with ſtrings or chords; to ſtring.—

What paſſion cannot muſick raiſe and quell?
When Jubia ſtruck the *chorded* ſhell,
His liſt'ning brethren ſtood around. *Dryden.*

CHORDA, in anatomy, a ſmall nerve extending over the drum of the ear.

CHORDAPSUS, in medicine, a diſeaſe of the inteſtines, called alſo volvulus, or the iliac passion.

(1.) * CHORDEE. *n. ſ.* [from *chorda*, Lat.] A contraction of the frœnum.

(2.) Chordee, in medicine and ſurgery, a ſymptom attending a gonorrhœa, conſiſting in a violent pain under the frenum, and along the duct of the urethra, during the erection of the penis, which is incurvated downwards. Theſe erections are frequent and involuntary.

CHOREA sancti viti. See Vitus's dance.

(1.) CHOREPISCOPUS, [from χωρος, a region, and επισκοπος, a biſhop,] in the ancient church, an officer about whoſe function the learned are not agreed. The chorepiſcopi were ſuffragan or local biſhops, holding a middle rank between biſhops and preſbyters, and delegated to exerciſe epiſcopal juriſdiction within certain diſtricts, when the boundaries of particular churches, over which ſeparate biſhops preſide, were conſiderably enlarged. It is not certain when this office was firſt introduced; ſome trace it to the cloſe of the firſt century; others tell us, that chorepiſcopi were not known in the eaſt till the beginning of the 4th century; and in the weſt about A. D. 439. They ceaſed both in the 10th century.

(2.) Chorepiscopus, [from χορος, choir,] is alſo the name of a dignity ſtill ſubſiſting in ſome cathedrals, particularly in Germany; ſignifying the ſame with *chori epiſcopus*, biſhop of the choir.

CHOREUS, [Χορειος,] a foot in the ancient poetry more commonly called *trochæus*. See Trochee.

CHORGES, or Gorges, a town of France, anciently poſſeſſed by the Caturigi, in the department of the Upper Alps, and ci-devant province of Dauphiny. It was burnt by the D. of Savoy, in 1692. It lies 10 m. E. of Gap. Lon. 6. 23. E. Lat. 44. 35. N.

CHORIAMBUS, in ancient poetry, a foot conſiſting of 4 ſyllables, whereof the firſt and laſt are long, and the two middle ones are ſhort; ſuch is the word *nobilitas*.

(1.) * CHORION. *n. ſ.* [χωρειν, to contain.] The outward membrane that enwraps the fœtus.

(2.) Chorion. See Foetus, and Midwifery.

* CHORISTER. *n. ſ.* [from *chorus*.] 1. A ſinger in cathedrals; uſually a ſinger of the lower order; a ſinging boy. 2. A ſinger in a concert. This ſenſe is, for the moſt part, confined to poetry.

And let the roaring organs loudly play
The praiſes of the Lord in lively notes;
The whiles, with hollow throats,
The *choriſters* the joyous anthem ſing. *Spenſer.*

CHOROBATA, or CHOROBATES, } a kind of water level among the ancients, of the figure of the letter T, according to Vitruvius's deſcription.

* CHOROGRAPHER. *n. ſ.* [from χωρα, a region, and γραφω, to deſcribe.] He that deſcribes particular regions or countries.

* CHOROGRAPHICAL. *adj.* [See Chorographer.] Deſcriptive of particular regions or countries; laying down the boundaries of countries.—I have added a *chorographical* deſcription of this terreſtrial paradiſe. *Raleigh.*

* CHOROGRAPHICALLY. *adj.* [from *chorographical*.] In a chorographical manner; according to the rule of chorography; in a manner deſcriptive of particular regions.

(1.) * CHOROGRAPHY. *n. ſ.* [See Chorographer.] The art or practice of deſcribing particular regions, or laying down the limits and boundaries of particular provinces. It is leſs in its object than geography, and greater than topography.

(2.) Chorography differs from geography, as the deſcription of a particular country differs from that of the whole earth; and from topography, as the deſcription of a country is different from that of a town or diſtrict. See Geography, Topography, and Map.

CHOROIDES, or Choroeides, [from χοριον, chorion, and ειδος, likeneſs,] in anatomy, a term applied to ſeveral parts of the body, bearing ſome reſemblance to the chorion: as,

1. Choroides, the inner membrane which inveſts the brain, more uſually called pia mater. See Anatomy, *Index*.

2. Choroides, the inner tunic of the eye. It is ſoft, thin, and black; and its inner or concave ſurface is very ſmooth and poliſhed. See Anatomy, § 573.

3. Choroides, Plexus. See Anatomy.

CHOROMETRY, [from χωρα and μετρεω, to meaſure,] the art of ſurveying countries.

(1.) * CHORUS. *n. ſ.* [*chorus*, Lat.] 1. A number of ſingers; a concert.—The Grecian tragedy was at firſt nothing but a new *chorus* of ſingers; afterwards one actor was introduced. *Dryden.*—Never did a more full and unſpotted *chorus* of human creatures join together in a hymn of devotion. *Addiſon.* 2. The perſons who are ſuppoſed to behold what paſſes in the acts of a tragedy, and ſing their ſentiments between the acts.—

For ſupply,
Admit me *chorus* to his hiſtory. *Shakeſpeare.*

3. The ſong between the acts of a tragedy. 4. Verſes of a ſong in which the company join the ſinger.

(2.) Chorus, in dramatic poetry. See § 1. *def.* 1 and 2. Tragedy in its origin was no more than a ſingle chorus, who trod the ſtage alone, and without any actors, ſinging dithyrambics or hymns in honour of Bacchus. Theſpis, to relieve the chorus, added an actor, who rehearſed the adventures of ſome of their heroes; and Æſchylus, finding a ſingle perſon too dry an entertainment, added a ſecond, at the ſame time reducing the ſinging of the chorus, to make more room for the recitation. But when tragedy began to be formed, the recitative, which at firſt was intended only as an acceſſory part to give the chorus a breathing time, became a principal part of the tragedy. At length, however, the chorus became incorporated into the action: ſometimes it was to ſpeak; and then their chief, whom they called *coryphæus*, ſpoke in behalf of the reſt; the ſinging was performed by the whole company; ſo that when the coryphæus ſtruck into a ſong, the chorus immediately joined him. The chorus ſometimes alſo joined the actors in the courſe of the repreſentation, with their plaints and lamentations on account of any unhappy accidents that befel them; but the proper function, and that for which it ſeemed chiefly retained, was to ſhow the intervals of the acts; while the actors were behind the ſcenes, the chorus engaged the ſpectators; their ſongs uſually turned on what was exhibited, and contained nothing but what was ſuited to the ſubject, and had a natural connection with it; ſo that the chorus concurred with the actors for advancing the action. In the modern tragedies the chorus is laid aſide, and the fiddles ſupply its place. M. Dacier looks on this retrenchment as of ill conſequence, thinks it robs tragedy of a great part of its luſtre, and therefore judges it neceſſary to re-eſtabliſh it, not only on account of the regularity of the piece, but alſo to correct, by prudent and virtuous reflections, any extravagances that might fall from the mouths of the actors when under any violent paſſion. M. Dacier obſerved alſo, that there was a chorus in the ancient comedy: but this is ſuppreſſed in the new comedy, becauſe it was uſed to reprove vices by attacking particular perſons; as the chorus of the tragedy was laid aſide to give the greater probability to thoſe kinds of intrigue which require ſecrecy.

(1.) * CHOSE. [the preter tenſe, and ſometimes the participle paſſive, from *To chooſe.*]—

Our ſovereign here above the reſt might ſtand,
And here be *choſe* again to rule the land. *Dryd.*

(II.) Chose, [Fr. *i. e.* a thing,] is uſed in common law with divers epithets; as *choſe local, choſe tranſitory*, and *choſe in action*.

1. Chose in action is a thing incorporeal, and only a *right*, as an obligation for debt, annuity, &c. In general all cauſes of ſuit for any debt, duty, or wrong, are to be accounted choſes in action, or *in ſuſpence;* becauſe they have no real exiſtence, nor can properly be ſaid to be in our poſſeſſion.

2. Chose local is ſuch a thing as is annexed to a place, as a mill and the like.

3. Chose transitory is a thing which is moveable, and may be taken away, or carried from place to place.

* CHOSEN. [the participle paſſive, from *To chooſe.*]—

If king Lewis vouchſafe to furniſh us
With ſome few bands of *choſen* ſoldiers,
I'll undertake to land them on our coaſt. *Shak.*

CHOSROES I. ſirnamed The Great, king of Perſia, ſucceeded his father Cabades, A. D. 532. He made peace with the Romans; but broke it in the 3d year, and forced Juſtinian to a diſadvantageous peace. Afterwards, he was ſo puffed up with his victories, as to bid the emperor's ambaſſador follow him for audience to Cæſarea: but Tiberius ſent an army under Juſtinian; who made himſelf maſter of the country, and put Choſroes to death in 586.

Chosroes II. the ſecond ſon of Hormiſdas, was raiſed to the throne of Perſia, by the people, who dethroned and impriſoned his father. He uſed him tenderly at firſt; but afterwards cauſed him to be put to death. This, together with his killing ſome of the nobility, obliged him to fly: he gave his horſe the bridle, which carried him into a town of the Romans, where Mauricius the emperor received him kindly, and ſent an army under Narſes, which ſet him again upon the throne. After this, he moſt ungratefully ſeized upon Jeruſalem, Libya, Egypt, and Carthage. Heraclius ſued for peace; which was offered him on condition, *That he and his ſubjects ſhould deny Jeſus Chriſt.*' Upon this, Heraclius attacked him with ſucceſs, and put him to flight. His own ſon purſued him, and he was ſtarved in priſon, A. D. 62[illegible].

(1.) * CHOUGH. *n. ſ.* [*ceo*, Sax. *choucas*, Fr.] A bird which frequents the rocks by the ſea ſide, like a jackdaw, but bigger. *Hanmer.*—In birds, kites and keſtrels have a reſemblance with hawks, crows with ravens, daws and *choughs*. *Bacon.*

(2.) Chough. See Corvus.

* CHOULE. *n. ſ.* [commonly pronounced and written *jowl.*] The crop of a bird.—The *choule* or crop, adhering to the lower ſide of the bill, and ſo deſcending by the throat, is a bag or ſachel. *Brown.*

CHOUS, in the eaſtern military orders, meſſengers of the divan of Janiſaries. There are ſeveral degrees of honour in this poſt. When a perſon is firſt advanced to it, he is called cuchuk, or little *chous;* after this he is advanced to be the *alloy chous;* that is, the meſſenger of ceremonies; and from this, having paſſed through the office of *petelma*, or procurator of the effects of the body, he is advanced to be the *bas chous.*

* *A* CHOUSE. *n. ſ.* [from the verb. This word is derived by *Henſhaw* from *kiaus*; or *chiaus*, a meſſenger of the Turkiſh court; who, ſays he, is

little better than a *fool*.] 1. A bubble; a tool; a man fit to be cheated.—

A ſottiſh *chouſe*,
Who, when a thief has robb'd his houſe,
Applies himſelf to cunning men. *Hudibras*.

2. A trick or ſham.

* *To* Chouse. *v. a.* [The original of this word is much doubted by *Skinner*, who tries to deduce it from the French *goſſer*, to laugh at; or *jancher*, to wheedle; and from the Teutonick *koſen*, to prattle. It is perhaps a fortuitous and cant word, without etymology.] 1. To cheat; to trick; to impoſe upon.—

From London they came, ſilly people to *chouſe*,
Their lands and their faces unknown. *Swift*.

2. It has *of* before the thing taken away by fraud.

When geeſe and pullen are ſeduc'd,
And ſows *of* ſucking pigs are *chous'd*. *Hudibras*.

(1.) CHOWAN, a county of N. Carolina, in Edenton diſtrict, bounded on the S. by Albemarle Sound, on the NE. by Perquiman's, on the N. by Gates, and on the W. by Harford counties. Edenton is the chief town.

(2.) Chowan, a conſiderable river of N. Carolina, formed by the confluence of the Black-water, Meherrin and Nottaway rivers, which riſe in Virginia and unite in N. Carolina, and thence running S. by E. enter the NW. end of Albemarle and for 15 miles upwards to Holliday's iſland it is navigable for ſmall veſſels.

CHOWDER beer, a cheap and eaſily prepared drink, highly commended for preventing the ſcurvey in long voyages, or for the cure of it, where it may have been contracted. It is prepared as follows: Take 12 gallons of water, in which put 3½ lb. of black ſpruce: boil it for 3 hours, and, having taken out the ſpruce, mix with the liquor 7 lb. of melaſſes, and boil it up; ſtrain it through a ſieve, and when milk warm put to it about 4 ſpoonfuls of yeſt to work it. In 2 or 3 days ſtop the bung of the caſk; and in 5 or 6 days, when fine, bottle it for drinking. Two gallons of melaſſes, treacle or coarſe ſugar, are ſufficient for an hogſhead of liquor.

CHOWLE, a ſmall fortified town of India, on the coaſt of Malabar, belonging to the Portugueſe. It has a harbour, and was formerly noted for its fine embroidered quilts. It lies 15 miles S. of Bombay. Lon. 72. 45. E. Lat. 18. 42. N.

* *To* CHOWTER. *v. n.* To grumble or mutter like a froward child. *Philips*.

CHRABRATE, in lithology, a pellucid ſtone mentioned by writers of the middle age, ſuppoſed to be the common pebble cryſtal.

CHREMNITZ, the principal of the mine towns in Upper Hungary, 90 miles NE. of Preſburg. Lon. 19. 27. E. Lat. 48. 59. N.

CHRENECRUDA, a term occurring in writers of the middle age, and expreſſing a cuſtom of thoſe times; but its ſignification is doubtful. It is mentioned in *Lege Salica*, Tit. 61. which ſays, he who kills a man, and hath not wherewithal to ſatisfy the law or pay the fine, makes oath that he hath delivered up every thing that he was poſſeſſed of; the truth of which muſt be confirmed by the oaths of 12 other perſons. Then he invites his next relations by the father's ſide to pay off the remainder of the fine, having firſt made over to them all his effects by the following ceremony. He goes into his houſe, and taking in his hand a ſmall quantity of duſt from each of the 4 corners, he returns to the door, and, with his face inwards, throws the duſt, with his left hand over his ſhoulders upon his neareſt of kin. Which done, he ſtrips to his ſhirt; and coming out with a pole in his hand, jumps over the hedge. His relations, whether one or ſeveral, are upon this obliged to pay off the compoſition for the murder. And if theſe (or any one of them) are not able to pay, *iterum ſuper illum chrenecruda, qui pauperior eſt, jactat, et ille totam legem componat.* Whence it appears, that *chrenecruda jactare* is the ſame with throwing the duſt, gathered from the four corners of the houſe. Goldaſtus and Spelman tranſlate it *viridem herbam*, green graſs, from the German *gruen kraut*, or from the Dutch *groen*, green, and *gruid*, graſs. Wendelinus thinks, that by this word is meant the proof of purification, from *chrein*, pure, and *keuren* to prove; ſo that it muſt refer to the oaths of the 12 Jurors. King Childebert reformed this law, becauſe it favoured of pagan ceremonies, and becauſe ſeveral perſons were thereby obliged to make over all their effects.

CHREVASTA, a large river of European Turkey, in Albania, anciently called *Apſus*.

(1.) * CHRISM. *n. ſ.* [χρῖσμα, an ointment.] Unguent; or unction: it is only applied to ſacred ceremonies.—One act never to be repeated, is not the thing that Chriſt's eternal prieſthood, denoted eſpecially by his unction or *chriſm*, refers to. *Hammond's Practical Catechiſm*.

(2.) Chrism, oil conſecrated by the biſhop, and uſed in the Romiſh and Greek churches, in the adminiſtration of baptiſm, confirmation, ordination, and extreme unction. It is prepared on holy Thurſday with much ceremony. In Spain it was anciently the cuſtom for the biſhop to take ⅓ of a ſol for the chriſm diſtributed to each church, on account of the balſam that entereth its compoſition. Du Cange obſerves, that there are two kinds of chriſm; the one prepared of oil and balſam, uſed in baptiſm, confirmation and ordination; the other of oil alone, conſecrated by the biſhop, uſed anciently for the catechumens, and ſtill in extreme unction. The Maronites before their reconciliation with Rome, beſides oil and balſam, uſed muſk, ſaffron, cinnamon, roſes, white frankincenſe, and ſeveral other drugs mentioned by Rynaldus, in 1541, with the doſes of each. Dandini, the Jeſuit, who went to mount Libanus in quality of the pope's nuncio, ordained, in a ſynod held there in 1596, that chriſm ſhould be made only of two ingredients, oil and balſam; the one repreſenting the human nature of Jeſus Chriſt, the other his divine nature.

(3.) Chrism pence, chrismatis denarii, or chrismales denarii, a tribute anciently paid to the biſhop by the pariſh-clergy, for their chriſm, conſecrated at Eaſter for the enſuing year: this was afterwards condemned as ſimoniacal.

CHRISMATION, the act of impoſing the chriſm. Moſt Roman divines hold this to be the next matter of the ſacrament of confirmation. The chriſmation in baptiſm is performed by the prieſt; in confirmation by the biſhop: in ordination, &c. it is more uſually ſtyled unction.

CHRISMATORY, the veſſel in which the chriſm is kept.

(1.) * CHRISOM. *n. ſ.* [See CHRISM.] A child that dies within a month after its birth. So called from the chriſom-cloth, a cloth anointed with holy unguent, which the children anciently wore till they were chriſtened.—When the convulſions were but few, the number of *chriſoms* and infants were greater. *Graunt's Bills of Mortality.*

(2.) CHRISOM, CHRISMALE, or CHRISOM CLOTH, the face cloth or piece of linen laid over the child's head when baptized.

(3.) CHRISOM CALF, a calf killed before it is a month old. *Aſh.*

CHRISOMUS, the time between the child's birth and baptiſm.

CHRIST, [Χριϛὸς, Gr. the anointed,] an appellation ſynonynious with *Meſſiah*, uſually added to JESUS; and, together therewith, denominating the Saviour of the world. See MESSIAH. Sometimes the word *Chriſt* is uſed ſingly, by way of *antonomaſis*, to denote a perſon ſent from God, as an anointed prophet, king, or prieſt.

CHRIST-BURG, a town of Poliſh Pruſſia, in the territory of Culm, 12 miles SE. of Marienburg.

(1.) CHRIST-CHURCH, a borough town of England in Hampſhire, ſituated on the E. ſide of the Avon, about 3 miles from the ſea, with a good ſalmon fiſhery, and a conſiderable trade in knit ſilk ſtockings and watch chains. It has a ſmall haven which admits veſſels of light burden at high water; and there is a weekly market on Monday. This borough ſends two members to parliament. It is 12 miles E. of Poole, and 101 WSW. of London. Lon. 1. 49. W. Greenwich. Lat. 50. 46. N.

(2.) CHRIST-CHURCH, a village in the county of Monmouth, E. of Caerleon.

* *To* CHRISTEN. *v. a.* [*chriſtnian*, Sax.] 1. To baptize; to initiate into chriſtianity by water. 2. To name; to denominate.—Where ſuch evils as theſe reign, *chriſten* the thing what you will, it can be no better than a mock millennium. *Burnet.*

* CHRISTENDOM. *n. ſ.* [from *Chriſt* and *dom.*] The collective body of chriſtianity; the regions of which the inhabitants profeſs the chriſtian religion.—What hath been done, the parts of *Chriſtendom* moſt afflicted can beſt teſtify. *Hooker.*

(1.) * CHRISTENING. *n. ſ.* [from the verb.] The ceremony of the firſt initiation into chriſtianity.—The queen was with great ſolemnity crowned at Weſtminſter, about two years after the marriage; like an old *chriſtening*, that had ſtaid long for godfathers. *Bacon.*—The day of the *chriſtening* being come, the houſe was filled with goſſips. *Arbuthnot and Pope.*

(2.) CHRISTENING. See BAPTISM.

(1.) * CHRISTIAN. *adj.* Profeſſing the religion of Chriſt.—

I'll not be made a ſoft and dull-ey'd fool,
To ſhake the head, relent, and ſigh, and yield
To *chriſtian* interceſſors. *Shakeſpeare.*

(2.) * CHRISTIAN. *n. ſ.* [*Chriſtianus*, Lat.] A profeſſor of the religion of Chriſt.—We *chriſtians* have certainly the beſt and the holieſt, the wiſeſt and moſt reaſonable religion in the world. *Tillotſon.*

(3.) CHRISTIAN, the name of 7 kings of Denmark. See DENMARK, HISTORY OF.

(4.) *Moſt* CHRISTIAN KING, a title of the kings of France. The French antiquaries trace the origin of this title up to Pope Gregory the Great, who, writing a letter to Charles Martel, ſtiled him *Moſt Chriſtian King*, a title which his ſucceſſors retained, though many of them proved themſelves very unworthy of it.

(5.) * CHRISTIAN NAME. *n. ſ.* The name given at the font, diſtinct from the Gentilitious name, or ſurname.

(6.) CHRISTIAN RELIGION, that inſtituted by Jeſus Chriſt. See CHRISTIANITY.

(7.) CHRISTIANS OF ST JOHN, a ſect of Chriſtians very numerous in Balſora and the neighbouring towns: they formerly inhabited along the river Jordan, where St John baptized, from whom they had their name. They hold an anniverſary feaſt of 5 days; during which they all go to the biſhop, who baptiſes them with the baptiſm of St John. Their baptiſm is alſo performed in rivers; and that only on Sundays: they have no notion of the Trinity, or the Holy Ghoſt; nor have they any canonical book, but abundance full of charms, &c. Their biſhoprics deſcended by inheritance, though they have the ceremony of an election.

(8.) CHRISTIANS OF ST THOMAS, a ſort of Chriſtians in a peninſula of India on this ſide of the Gulf: they inhabit chiefly at Cranganor, and the neighbouring country: they admit of no images: but pay a great veneration to the croſs: they affirm, that the ſouls of the ſaints do not ſee God till after the day of judgment: they acknowledge 3 ſacraments, *viz.* baptiſm, orders, and the eucharift: they make no uſe of holy oils in the adminiſtration of baptiſm; but, after the ceremony, anoint the infant with an unction compoſed of oil and walnuts, without any benediction. In the euchariſt, they conſecrate with little cakes made of oil and ſalt, and inſtead of wine make uſe of water in which raiſins have been infuſed.

(9.) CHRISTIANS, PRIMITIVE, ACCOUNT OF THE. Theſe diſciples and followers of Chriſt and his apoſtles were firſt denominated CHRISTIANS at Antioch, A. D. 42. The firſt Chriſtians diſtinguiſhed themſelves in the moſt remarkable manner by their conduct and their virtues. The faithful, whom the preaching of St Peter had converted, hearkened attentively to the exhortations of the Apoſtles, who failed not carefully to inſtruct them as perſons who were entering upon an entirely new life. They attended the temple daily, doing nothing different from the other Jews, becauſe it was yet not time to ſeparate from them. But they made a ſtill greater progreſs in virtue; for they ſold all that they poſſeſſed, and diſtributed their goods in proportion to the wants of their brethren. The primitive Chriſtians were not only remarkable for the practice of every virtue, but were alſo very eminently diſtinguiſhed by the many miraculous gifts and graces beſtowed by God upon them. St Irenæus and the other primitive fathers mention many inſtances of theſe.

(1.) CHRISTIANS, PRIMITIVE, ANTIPATHY AND CALUMNIES OF THE JEWS, &C. AGAINST. The Jews were the firſt and the moſt inveterate enemies the Chriſtians had. They put them to death as often as they had it in their power; and when they revolted againſt the Romans in the time of the emperor Adrian, Barchochebas, the head of that revolt, employed againſt the Chriſtians the moſt rigorous puniſhments to compel them to blaſpheme and renounce Jeſus Chriſt. And we find that even in the 3d century, they endeavoured to get into their hands Chriſtian women, in order to ſourge and ſtone them in their ſynagogues. They curſed the Chriſtians ſolemnly three times a day in their ſynagogues, and their rabbins would not ſuffer them to converſe with chriſtians upon any occaſion. Nor were they contented to hate and deteſt them; but they diſpatched emiſſaries all over the world to defame the Chriſtians, and ſpread all ſorts of calumnies againſt them. But the lives and behaviour of the firſt Chriſtians were ſufficient to refute all that was ſaid againſt them, and evidently demonſtrated that theſe accuſations were mere calumny and the effect of inveterate malice. Pliny the younger, who was governor of Pontus and Bithynia between the years 103 and 105, gives the following very particular account of the Chriſtians in that province, in a letter to the emperor Trajan: "I take the liberty, Sir, to to give you an account of every difficulty which ariſes to me. I have never been preſent at the examination of the Chriſtians; for which reaſon I know not what queſtions have been put to them, nor in what manner they have been puniſhed. My behaviour toward thoſe who have been accuſed to me has been this: I have interrogated them, in order to know whether they were really Chriſtians. When they have confeſſed it, I have repeated the ſame queſtion two or three times threatening them with death if they did not renounce this religion. Thoſe who have perſiſted in their confeſſion, have been, by my order, led to puniſhment. I have even met with ſome Roman citizens guilty of this phrenſy, whom, in regard to their quality, I have ſet apart from the reſt, in order to ſend them to Rome. Theſe perſons declare, that their whole crime if they are guilty, conſiſts in this; that, on certain days, they aſſemble before ſun riſe, to ſing alternately the praiſes of Chriſt, as of a god, and to oblige themſelves, by the performances of their religious rites, not to be guilty of theft, or adultery, to obſerve inviolably their word, and to be true to their truſt. This diſpoſition has obliged me to endeavour to inform myſelf ſtill farther of this matter, by putting to the torture two of their women ſervants, whom they call *deaconeſſes*: but I could learn nothing more from them, than that the ſuperſtition of theſe people is as ridiculous, as their attachment to it is aſtoniſhing."

(11.) **CHRISTIANS, PRIMITIVE, ANTONINUS'S VINDICATION OF THE.** There is extant a juſtification, or rather panegyric, of the Chriſtians, pronounced by a Pagan prince. It is a letter of the emperor Antoninus, written in the year 152, in anſwer to the States of Aſia, who had accuſed the Chriſtians of being the cauſe of ſome earthquakes, which had happened in that part of the world. The emperor adviſes them to "take care, leſt, in torturing and puniſhing thoſe whom they accuſed of Atheiſm (meaning the Chriſtans,) they ſhould render them more obſtinate, inſtead of prevailing upon them to change their opinion; ſince their religion taught them to ſuffer with pleaſure for the ſake of God." As to the earthquakes which had happened, he puts them in mind, "that they themſelves are always diſcouraged, and ſink under ſuch misfortunes; whereas the Chriſtians never diſcovered more cheerfulneſs and confidence in God than on ſuch occaſions." He tells them, that "they pay no regard to religion, and neglect the worſhip of the Eternal; and, becauſe the Chriſtians honour and adore Him, therefore they are jealous of them, and perſecute them even to death." He concludes: "Many of the governors of provinces have formerly wrote to my father concerning them; and his anſwer always was, that they ſhould not be moleſted or diſturbed, provided they quietly ſubmitted to the authority of the government. Many perſons have likewiſe conſulted me upon this affair, and I have returned the ſame anſwer to them all; namely, that if any one accuſes a Chriſtian, merely on account of his religion, the accuſed perſon ſhall be acquitted, and the accuſer himſelf puniſhed." This ordinance, according to Euſebius, was publicly fixed up at Epheſus in an aſſembly of the ſtates.

(12.) **CHRISTIANS, PRIMITIVE, CAUSES OF THE PERSECUTIONS OF.** The purity of the Chriſtian morality, directly oppoſite to the corruption of the Pagans, was doubtleſs one of the moſt powerful motives of the public averſion. Beſides their worſhipping Jeſus Chriſt, as God, was contrary to one of the moſt ancient laws of the Roman empire, which expreſsly forbad the acknowledging of any God which had not been approved by the ſenate. But notwithſtanding the violent oppoſition made to the eſtabliſhment of the Chriſtian religion, it gained ground daily, and very ſoon made a ſurpriſing progreſs in the Roman empire. In the third century, there were Chriſtians in the camp, in the ſenate, in the palace; in ſhort every where, but in the temples and the theatres: they filled the towns, the country, the iſlands. Men and women, of all ages and conditions, and even thoſe of the firſt dignities, embraced the faith; inſomuch that the Pagans complained that the revenues of their temples were ruined. They were in ſuch great numbers in the empire, that (as Tertullian expreſſes it) were they to have retired into another country, they would have left the Romans only a frightful ſolitude.

(1.) **CHRISTIANA**, a navigable creek of the United States, in Delaware.

(2.) **CHRISTIANA**, a town of Delaware, ſeated on the above creek, in Newcaſtle county. It is the greateſt carrying place between the waters of the Delaware and Cheſapeak, which are here only 13 miles aſunder. It is 4 miles SW. of New Caſtle and 7 SW. of Wilmington.

(3.) **CHRISTIANA**, or **CHRISTIANIA**, a city of Southern Norway, in the government of Aggerhuys, ſituated at the extremity of a fertile valley, forming a ſemicircular bend along the ſhore of the beautiful bay of Biorning, which forms the N. extremity of the gulf of Chriſtiania. It is divided into the city, and the ſuburbs of Waterlandt, Peterwigen, and Fierdingen: the fortreſs of AGGERHUYS; and the old town of OPSLOE or ANSLO. The city contains 418 houſes, the ſuburbs 682, Opſloe 400, and the inhabitants amount in all to about 9000. The city was rebuilt in its preſent ſituation by Chriſtian IV. after a plan deſigned by himſelf. The ſtreets are carried in a ſtraight line, and at right angles to each other, are uniformly 40 feet broad, and very neat and clean. The governor is the chief governor of Norway, and preſides in the high court of juſtice. Opſloe was the ſite of the old city, burnt in 1624: it contains an epiſcopal palace. Chriſtiania has an excellent harbour, and carries on a conſiderable trade. Its principal exports are tar, ſoap, iron, copper, planks, deals, and alum. There are 136 privileged ſaw mills at Chriſtiana, of which 100 belong to a ſingle family of the name of Anker. Chriſtiana is 30 miles from the ſea, and 290 N. by W. of Copenhagen. Lon. 10. 50. E. Lat. 59. 6. N.

CHRISTIANAUX, a lake of North America, in Labrador.

CHRISTIANBURG, a fort of Africa, on the Gold Coaſt, ſubject to Denmark.

* CHRISTIANISM. *n. ſ.* [*chriſtianiſmus*, Lat.] 1. The chriſtian religion. 2. The nations profeſſing chriſtianity.

(1.) * CHRISTIANITY. *n. ſ.* [*chretiente*, Fr.] The religion of Chriſtians.—God doth will that couples, which are married, both infidels, if either party be converted into *chriſtianity*, this ſhould not make ſeparation. *Hooker*.—Every one, who lives in the habitual practice of any voluntary ſin, cuts himſelf off from *chriſtianity*. *Addiſon*.

(2.) CHRISTIANITY, ACCOUNT OF THE FOUNDATION OF. Moſt, if not all Chriſtians, whatever their particular tenets may be, acknowledge the Scriptures of the Old and New Teſtaments as the ſole foundation of their faith and practice. But as theſe books, or at leaſt particular paſſages in them, have, from the ambiguity of language, been variouſly interpreted by different commentators, theſe diverſities have given birth to a multiplicity of different ſects. It cannot, therefore, be expected, that in giving an account of Chriſtianity, we ſhould comprehend all the opinions which have been exhibited by hiſtorical, ſyſtematical, or polemical authors. Theſe, in ſuch a work as this, can only be very briefly noticed under their proper articles. Our preſent buſineſs, is only to give a ſketch of ſuch facts and doctrines as uniformly have been, and ſtill are, recognized and admitted by the great majority of Chriſtians. Theſe, or at leaſt the greateſt number of them, appeal to the ſcriptures of the Old and New Teſtaments as the ultimate ſtandard, the only infallible rule of faith and manners. If aſked by what authority theſe books claim an abſolute right, to determine the conſciences and underſtandings of men, with regard to what they ſhould believe and what they ſhould do? they anſwer, that all ſcripture, whether for doctrine, correction, or reproof, was given by immediate inſpiration from God. If again interrogated how thoſe books, which they call *Scripture*, are authenticated? they reply, that the Old and New Teſtaments are proved to be the Word of God, by evidences both external and internal. See § 3.

(3.) CHRISTIANITY, EVIDENCES OF THE TRUTH OF. The external evidences of the authenticity and divine authority of the ſcriptures, may be divided into *direct* and *collateral*. The direct evidences are ſuch as ariſe from the nature, conſiſtency, and probability, of the facts; and from the ſimplicity, uniformity, competency, and fidelity, of the teſtimonies by which they are ſupported. The collateral evidences, are either the ſame occurrences ſupported by Heathen teſtimonies, or others which concur with and corroborate the hiſtory of Chriſtianity. Its *internal* evidences ariſe either from its exact conformity with the character of God, from its aptitude to the frame and circumſtances of man, or from thoſe ſupernatural convictions and aſſiſtances which are impreſſed on the mind by the immediate operation of the divine Spirit. Theſe can only be mentioned in a curſory manner in a detail ſo conciſe as the preſent. Such facts as are related in the hiſtory of his religion, the Chriſtian aſſerts to be not only conſiſtent each with itſelf, but likewiſe one with another. By a ſeries of antecendents and conſequences, they corroborate each other, and form a chain which cannot be broken but by an abſolute ſubverſion of all hiſtorical authenticity. The facts, on which Chriſtianity is founded, not only conſtitute a ſeries of themſelves, but are likewiſe in ſeveral periods the beſt reſources for ſupplying the chaſms in the hiſtory of our nature, and preſerving the tenor of its annals entire. The facts themſelves are either natural or ſupernatural. By natural facts we mean ſuch occurences as happen or may happen from the various operations of mechanical powers, or from the interpoſition of natural agents without higher aſſiſtants. Such are all the common occurrences of hiſtory. By ſupernatural facts, we mean ſuch as could not have been produced without the interpoſition of the Deity, or at leaſt of powers ſuperior to the laws of mechaniſm, or the agency of embodied ſpirits. Among theſe may be reckoned the immediate change of water into wine, the inſtantaneous cure of diſeaſes without the intervention of medicine, the reſuſcitation of the dead, and the like. In this order of occurrences may likewiſe be numbered the exertions and exhibitions of prophetic power, where the perſons, by whom theſe extraordinary talents were diſplayed, could neither by penetration nor conjecture unravel the mazes of futurity, and trace the events of which they ſpoke from their primary cauſes to their remote completions: So that they muſt have been the paſſive organs of ſome ſuperior Being, to whom the whole concatenation of cauſes and effects, which operate from the origin to the conſummation of nature, was obvious at a glance of thought. The facts which we have called *natural*, not only agree with the analogy of human events, and corroborate each other, but in many inſtances illuſtrate the hiſtory of nature in general. Of theſe a Chriſtian might offer one out of many, of which philoſophy will not be able to produce any tolerable ſolution, without having recourſe to the facts upon which Chriſtianity is founded. For if mankind were originally deſcended from one pair alone, how ſhould it have happened that long before the date of authentic hiſtory every nation had its own diſtinct language? Or, if, as ſome late philoſophers have maintained, man is an indigenous animal in every country; or, was originally produced in, and created for, each particular ſoil and climate which he inhabits, whence the prodigious multiplicity, the immenſe diverſity, of languages? Is the language of every nation intuitive or were they dictated by exigencies, and eſtabliſhed by convention? If the laſt of theſe ſuppoſitions be true, what an immenſe period of time muſt have paſſed? How many revolutions of material and intellectual nature muſt have happened? What acceſſions of knowledge, refinement, and civilization, muſt human intercourſe have gained before the formation and eſtabliſhment even of the moſt ſimple, imperfect, and barbarous language? Why is a period ſo vaſt, obliterated ſo entirely as to eſcape the retroſpect of hiſtory, of tradition, and even of fable itſelf? Why was the acquiſition and improvement of other arts ſo infinitely diſtant from that of language, that the æra of the latter is entirely loſt, whilſt we can trace the former from their origin through the various gradations of their progreſs? This cloud of difficulties, inextricable by all the lights of hiſtory or philoſophy, this more than Cimmerian darkneſs, is immediately diſſipated by the Moſaic account of the confuſion of tongues; wiſely intended to ſeparate the tribes of men from each other, to repleniſh the ſurface of the globe, and to give its multiplied inhabitants thoſe opportunities of improvement which might be derived from experiment and induſtry, variouſly exerted, according to the different ſituations in which they were placed, and the different employments which theſe ſituations dictated. Thus the time of nature's exiſtence is limited to a period within the ken of human intellect. Thus whatever has happened might have happened during the preſent mode of things; whereas, if we deduce the origin and diverſity of language from a period ſo remotely diſtant as to be abſolutely loſt, and entirely detached from all the known occurrences and viciſſitudes of time, we muſt admit the preſent forms and arrangements of things to have ſubſiſted perhaps for a much longer duration than any mechanical philoſopher will allow to be poſſible. Other inſtances equally pregnant with conviction might be multiplied; but, precluded by the limits of our plan we proceed to a ſingle obſervation upon the facts which have been termed *ſupernatural.* Of thoſe changes which happen in ſenſible objects, ſenſation alone can judge. Reaſon has nothing to do in the matter. She may draw concluſions from the teſtimonies of ſenſe, but can never refute them. If, therefore, our ſenſes inform us that ſnow is white, in vain would the moſt learned and ſubtile philoſopher endeavour to convince us that it was of a contrary colour. He might confound us, but never could perſuade us. Such changes, therefore, as appear to happen in ſenſible objects, muſt either be real or fallacious. If real, the miracle is admitted; if fallacious, there muſt be a cauſe of deception equally unaccountable from the powers of nature, and therefore equally miraculous. If the veracity or competency of the witneſſes be queſtioned, the Chriſtian anſwers, that they muſt be competent, becauſe the facts which they relate are not beyond their capacity to determine. They muſt likewiſe be faithful, becauſe they had no ſecular motives for maintaining, but many for ſuppreſſing or diſguiſing, what they teſtified. Now the Chriſtian appeals to the whole ſeries of hiſtory and experience, whether ſuch a man is or can be found, as will offer a voluntary, ſolemn and deliberate ſacrifice of truth at the ſhrine of caprice. But ſuch facts as, after a long continuance of time, have been found exactly agreeable to predictions formerly emitted, muſt ſuperſede the fidelity of teſtimony, and infallibly prove that the event was known to the Being by whom it was foretold. In vain has it been urged, that prophecies are ambiguous and equivocal. For though they may prefigure ſubordinate events, yet if the grand occurrences to which they ultimately relate, can alone fulfil them in their various circumſtances, and in their utmoſt extent, it is plain, that the Being by whom they were revealed muſt have been actually preſcient of thoſe events, and muſt have had them in view when the predictions were uttered. See MIRACLE, PROPHECY, &c.

(4.) **CHRISTIANITY, GENERAL DOCTRINE OF.** It muſt be obvious to every reflecting mind, that whether we attempt to form the idea of any religion *a priori,* or contemplate thoſe which have been already exhibited, certain facts, and principles muſt be pre-eſtabliſhed, from whence will reſult a particular frame of mind and courſe of action, ſuitable to the character and dignity of that Being, by whom the religion is enjoined, and adapted to the nature and ſituation of thoſe agents who are commanded to obſerve it. Hence Chriſtianity may be divided into *credenda* or doctrines, and *agenda* or precepts. As the great foundation of his religion, therefor, the Chriſtian believes the exiſtence and government of one eternal and infinite Eſſence, which for ever retains in itſelf the cauſe of its own exiſtence, and inherently poſſeſſes all thoſe perfections which are compatible with its nature: ſuch are, its almighty power, omniſcient wiſdom, infinite juſtice, boundleſs goodneſs, and univerſal preſence. In this indiviſible eſſence the Chriſtian recogniſes three diſtinct ſubſiſtences, yet diſtinguiſhed in ſuch a manner as not to be incompatible either with eſſential unity of being, or with their perſonal diſtinction. Each of them poſſeſſes the ſame nature and properties to the ſame extent. As, therefore, they are conſtituent of one God, if we may uſe the expreſſion, there is none of them ſubordinate, none ſupreme. The only way by which the Chriſtian can diſcriminate them is, by their various relations, properties, and offices. Thus the Father is ſaid eternally to beget the Son, the Son to be eternally begotten of the Father, and the Holy Ghoſt eternally to proceed from both. This infinite Being was graciouſly pleaſed to create an univerſe replete with inferior intelligences, who might for ever contemplate and enjoy his glory, participate his happineſs, and imitate his perfections. But as freedom of will is eſſential to the nature of moral agents, that they may co-operate with God in their own improvement and happineſs, ſo their natures and powers are neceſſarily limited, and by that conſtitution rendered peaceable. This degeneracy firſt took place in a rank of intelligence ſuperior to man. But guilt is never ſtationary. Impatient of itſelf, and curſed with its own feelings, it proceeds from bad to worſe, whilſt the poignancy of its torments increaſes with the number of its perpetrators. Such was the ſituation of Satan and his apoſtate angels. They attempted to transfer their turpitude and miſery to man; and were, alas! but too ſucceſsful. Hence the heterogeneous and irreconcileable principles which operate in his nature. Hence that inexplicable medley of wiſdom and folly, of rectitude and error, of benevolence and malignity, of ſincerity and fraud, exhibited through his whole conduct. Hence the darkneſs of his underſtanding, the depravity of his will, the pollution of his heart, the irregularity of his affections, and the abſolute ſubverſion of his whole internal economy. Theſe ſeeds of perdition ſoon ripened into overt acts of guilt and horror. All the hoſtilities of nature were confronted, and the whole ſublunary creation became a theatre of diſorder and miſchief. Here the Chriſtian once more appeals to fact and experience. If theſe things are ſo, if *man* is the veſſel of guilt, and the victim of miſery; he demands how this conſtitution of things can be accounted for? How can it be ſuppoſed, that a being ſo wicked and unhappy ſhould be the production of an infinitely good and infinitely perfect Creator? He therefore inſiſts, that human nature muſt have been diſarranged and contaminated by ſome violent ſhock; and that, of conſequence, without the light diffuſed over the face of things by Chriſtianity, all nature muſt remain an inſcrutable and inexplicable myſtery. To redreſs theſe evils, to re-eſtabliſh the empire of virtue and happineſs, to reſtore the nature of man to its primitive rectitude, to ſatiſfy the remonſtrances of infinite juſtice, to purify every original or contracted ſtain, to expiate the guilt and deſtroy the power of vice, the eternal Son of God, from whom Chriſtianity takes its name, and to whom it owes its origin, deſcended from the boſom of his Father; aſſumed the human nature; became the repreſentative of man; endured a ſevere probation in that character; exhibited a pattern of perfect righteouſneſs; and at laſt ratified his doctrine, and fully accompliſhed all the ends of his miſſion, by a cruel, unmerited, and ignominious death. Before he left the world, he delivered the doctrine of human ſalvation, and the rules of human conduct, to his apoſtles, whom he empowered to inſtruct the world in all that concerned their eternal felicity, and whom he inveſted with miraculous gifts to aſcertain the reality of what they taught. To them he likewiſe promiſed another comforter, even the Divine Spirit, who ſhould relume the darkneſs, conſole the woes, and purify the ſtains, of human nature. Having remained for a part of three days under the power of death, he aroſe again from the grave, appeared to his diſciples, and many others, converſed with them for ſome time, then re-aſcended to heaven; from whence the Chriſtian expects him, according to his promiſe, to appear as the Sovereign Judge of the living and the dead, from whoſe awards there is no appeal, and by whoſe ſentence the deſtiny of the pious and the wicked ſhall be eternally fixed. Soon after his departure to the right hand of his Father, where, in his human nature, he ſits ſupreme of all created beings, and inveſted with the abſolute adminiſtration of heaven and earth the Spirit of grace and conſolation deſcended on his apoſtles with viſible ſignatures of divine power and preſence. Nor were his ſalutary operations confined to them, but extended to all the rational world, who did not by obſtinate guilt repel his influences, and provoke him to withdraw them. Theſe, indeed, were leſs conſpicuous than at the glorious æra when they were viſibly exhibited in the perſons of the apoſtles. But though his energy is leſs obſervable, it is by no means leſs effectual to all the purpoſes of grace and mercy. The Chriſtian is convinced, that there is and ſhall continue to be a ſociety upon earth, who worſhip God as revealed in Jeſus Chriſt; who believe his doctrines; who obſerve his precepts; and who ſhall be ſaved by the merits of his death, and by the uſe of theſe external means of ſalvation which he hath appointed. The ſacraments of baptiſm and the euchariſt, the interpretation and application of ſcripture, the habitual exerciſe of public and private devotion, are obviouſly calculated to diffuſe and promote the intereſts of truth and virtue, by ſuperinducing the ſalutary habits of faith, love, and repentance. The Chriſtian is firmly perſuaded, that at the conſummation of all things, when the purpoſes of providence in the various revolutions of progreſſive nature are accompliſhed, the whole human race ſhall once more iſſue from their graves: ſome to immortal felicity, in the actual perception and enjoyment of their Creator's preſence; others to everlaſting ſhame and miſery.

(5.) **CHRISTIANITY, MORALITY OF.** The two grand principles of action, according to the Chriſtian, are, The love of God, which is the ſovereign paſſion in every perfect mind; and the love of man, which regulates our actions according to the various relations in which we ſtand, whether to communities or individuals. This ſacred connection ought never to be totally extinguiſhed by any temporary injury. It ought to ſubſiſt in ſome degree even amongſt enemies. It requires that we ſhould pardon the offences of others, as we expect pardon for our own; and that we ſhould no farther reſiſt evil, than is neceſſary for the preſervation of perſonal rights and ſocial happineſs. It dictates every relative and reciprocral duty between parents and children, maſters and ſervants, governors and ſubjects, friends and friends, men and men. Nor does it merely enjoin the obſervation of equity, but likewiſe inſpires the moſt ſublime and extenſive charity, a boundleſs and diſintereſted effuſion of tenderneſs for the whole ſpecies, which feels their diſtreſs and operates for their relief and improvement. Theſe celeſtial diſpoſitions, and the different duties which are their natural exertions, are the various gradations by which the Chriſtian hopes to attain the perfection of his nature, and the moſt exquiſite happineſs of which it is ſuſceptible.

(6.) **CHRISTIANITY, PROPAGATION OF.** The Chriſtian religion was early and rapidly propagated through the whole Roman empire, which then contained almoſt the whole known world. And though in the providence of God, Mahometans and Idolaters have been ſuffered to poſſeſs themſelves of thoſe places in Greece, Aſia, and Africa, where the Chriſtian religion formerly moſt flouriſhed;

riſhed; yet there are ſtill ſuch remains of the Chriſtian religion among them as to give them opportunity ſufficient to be converted. For, in the dominions of the Turk in Europe, the Chriſtians make two third parts at leaſt of the inhabitants; and in Conſtantinople itſelf there are about twenty Chriſtian churches, and above thirty in Theſſalonica. Philadelphia, now *Ala-ſhahir*, has no fewer than twelve Chriſtian churches. The whole iſland of Chio is governed by Chriſtians; and ſome iſlands of the Archipelago are inhabited by Chriſtians only. In Africa, beſides the Chriſtians living in Egypt, and in the kingdoms of Congo and Angola, the iſlands upon the weſtern coaſts are inhabited by Chriſtians; and the vaſt kingdom of Abyſſinia, ſuppoſed to be as big as Germany, France, Spain, and Italy, put together, is poſſeſſed by Chriſtians. In Aſia, moſt part of the empire of Ruſſia, the countries of Circaſſia and Mingrelia, Georgia, and Mount Libanus, are inhabited only by Chriſtians. In America, it is notorious that the Chriſtians are very numerous, and ſpread over moſt parts of that vaſt continent. Mr Gibbon in his *Hiſtory of the Decline and Fall of the Roman Empire*, aſcribes the propagation of Chriſtianity to ſecondary cauſes; but it has been ſhown by ſeveral able writers that the five cauſes mentioned by him were by no means equal to the effects attributed to them. Chriſtianity was propagated by cauſes of a much ſuperior kind. See MIRACLE, and THEOLOGY.

(7.) **CHRISTIANITY, REASONABLENESS OF.** From the brief view above given of the ſpeculative and practical doctrines of Chriſtianity, (§ 4, 5.) its reaſonableneſs plainly appears. By the former, the origin, œconomy, and revolutions of intelligent nature can alone be rationally explained. By the latter, the nature of man, whether conſidered in its individual or ſocial capacity, can alone be conducted to its higheſt perfection and happineſs. With determined Atheiſts Chriſtians ſcarcely deign to expoſtulate. Philoſophers who can deduce the origin and conſtitution of things from caſual rencounters or mechanical neceſſity, may deduce any concluſion from any premiſes. Nor can a more glaring inſtance of abſurdity be produced, than the idea of a *ſelf-originated univerſe* When Deiſts upbraid them with myſterious or incompatible principles, they without heſitation remit ſuch cavillers to the creed of natural religion. They demand why any reaſoner ſhould refuſe to believe 3 diſtinct ſubſiſtences in one indiviſible eſſence, who admits that a being may be omni-preſent without extenſion; or that he can impreſs motion upon other things, while he himſelf is neceſſarily immoveable. They aſk the ſage, why it ſhould be thought more extraordinary, that the Son of God ſhould be ſent into this world, that he ſhould unite the human nature to his own, that he ſhould ſuffer and die for the relief of his degenerate creatures, than that a Being whoſe felicity is eternal, inherent, and infinite, ſhould have any motive for creating beings exterior to himſelf? Is it not, ſays the Chriſtian, equally worthy of the divine interpoſition, to reſtore order and happineſs where they are loſt, as to communicate them where they never have been? Is not infinite goodneſs equally conſpicuous in relieving miſery as in diffuſing happineſs? Is not the exiſtence of what we call evil in the world, under the tuition of an infinitely perfect Being, as inſcrutable as the mean exhibited by Chriſtianity for its abolition? Vicarious puniſhment, imputed guilt and righteouſneſs, merit or demerit transferred, are certainly not leſs reconcileable to human reaſon, *a priori*, than the exiſtence of vice and puniſhment in the productions of infinite wiſdom, power, and goodneſs: particularly when it is conſidered, that the virtue exerted and diſplayed by a perfect Being in a ſtate of humiliation and ſuffering, muſt be meritorious, and may therefore be rewarded by the reſtored felicity of inferior creatures, in proportion to their glory and excellence; and that ſuch merit may apply the bleſſings which it has deſerved, in whatever manner, in whatever degree, and to whomſoever it pleaſes, without being under any neceſſity to violate the freedom of moral agents, in recalling them to the paths of virtue and happineſs, by a mechanical and irreſiſtible force. It will be granted to philoſophy by the Chriſtian, that as no theory of mechanical nature can be formed, without preſuppoſing ſacred and eſtabliſhed laws from which ſhe ought rarely or never to deviate, ſo in fact ſhe tenaciouſly purſues theſe general inſtitutions, and from their conſtant obſervance reſult the order and regularity of things. But he cannot admit, that the important ends of moral and intellectual improvement may be uniformly obtained by the ſame means. He affirms, that if the hand of God ſhould either remain always entirely inviſible, or at leaſt only perceptible in the operation of ſecond cauſes, intelligent beings would be apt in the courſe of time, to reſolve the interpoſitions of Deity into the general laws of mechaniſm; to forget his connection with nature, and conſequently their dependence upon him. Hence, according to the dictates of common ſenſe, and to the unanimous voice of every religion in every age or clime, for the purpoſes of wiſdom and benevolence, God may not only control, but has actually controlled, the common courſe and general operations of nature. So that, as in the material world the law of *cauſe* and *effect* is generally and ſcrupulouſly obſerved for the purpoſes of natural ſubſiſtence and accommodation; thus ſuſpenſes and changes of that univerſal law are equally neceſſary for the advancement of moral and intellectual perfection.

(8.) **CHRISTIANITY, SUPERIORITY OF, TO ALL OTHER RELIGIONS.** The diſciple of Jeſus not only contends, that no ſyſtem of religion has ever yet been exhibited ſo conſiſtent with itſelf, ſo congruous to philoſophy and the common ſenſe of mankind, as Chriſtianity; he likewiſe avers, that it is infinitely more productive of real conſolation than any other religious or philoſophical tenets, which have ever entered into the ſoul, or been applied to the heart of man. For what is death to that mind which conſiders eternity as the career of its exiſtence? What are the frowns of fortune to him who claims an eternal world as his inheritance? What is the loſs of friends to that heart which feels, with more than natural conviction, that it ſhall quickly rejoin them in a more tender, intimate, and permanent intercourſe, than any of which the preſent life is ſuſceptible? What are the viciſſitudes of external things, to a mind which ſtrongly and uniformly anticipates a ſtate of endleſs and immutable felicity? What are mortifications, diſappointments, and inſults, to a ſpirit which is conſcious of being the original offſpring and adopted child of God; which knows that its omnipotent Father will, in proper time, effectually aſſert the dignity and privileges of its nature? In a word, as this earth is but a ſpeck in the creation, as time is not an inſtant in proportion to eternity, ſuch are the hopes and proſpects of the Chriſtian in compariſon of every ſublunary misfortune or difficulty. It is therefore, in his judgment, the eternal wonder of angels, and indelible opprobrium of man, that a religion ſo worthy of God, ſo ſuitable to the frame and circumſtances of our nature, ſo conſonant to all the dictates of reaſon, ſo friendly to the dignity and improvement of intelligent beings, ſo pregnant with genuine comfort and delight, ſhould be rejected and deſpiſed. Were there a poſſibility of ſuſpenſe or heſitation between this and any other religion extant, he could freely truſt the determination of a queſtion ſo important to the candid deciſion of real virtue and impartial philoſophy. In a word, as the late profeſſor J. H. Beattie juſtly obſerves of Chriſtian morality, in his *Farewell Lecture*, delivered in Mariſchal College, 1ſt April, 1789.—"To attain our greateſt happineſs in heaven, we have only to prefer and purſue what is in reality our greateſt happineſs on earth. Yet were Chriſtian virtue attended in this life by hardſhips infinitely exceeding thoſe that now attend it, nay, were it one unceaſing hardſhip of both mind and body, no rational being, who ſought his own intereſt, could heſitate to practiſe it, conſidering the authority by which it is enjoined, and the everlaſting importance of the ſanctions awaiting it hereafter. For the New Teſtament not only contains a ſyſtem of moral doctrine ſo pure and perfect, as would deſerve the acquieſcence of every true philoſopher, even if it had been propoſed by no divine authority, or connected with no eternal retribution, but is, moreover, atteſted by proofs ſo ſtrong and ſo various, that the converſion of thoſe who reject it could hardly be hoped for, though a meſſenger from the dead were commiſſioned on purpoſe. This may ſeem paradoxical, yet any candid man, who is acquainted with the hiſtory of the Chriſtian church, may eaſily convince himſelf, that it is not the want of reaſonable evidence in our religion, which makes the infidel diſlike it, but the want of licentious doctrine, a want which no meſſenger from the dead could be expected to ſupply. Look on the conduct and morality of unbelievers. Where is the man among them whoſe virtue has ſuggeſted an improvement of that ſyſtem, which he renounces as imperfect? Alas! He renounces it in order, not to improve his virtue, but to hide from himſelf his ſins, of which it would perpetually remind him. Where is the man among them, who retains in other inquiries that ſcrupuloſity of logic, which he tortures to perplex the evidence of the goſpel? Alas the blaſphemy of Voltaire is tried by gentler ſcrutiny, than the doctrine of Jeſus; and at laſt we learn, that, in oppoſition to the cruelty of ſome intereſted Jews, the obſtinacy of a few ancient believers in magic, the palpable miſtakes and miſrepreſentations of inſidious or ignorant men, the apoſtacy of a profligate emperor, the ſneer of a petulant Frenchman—the opinions of the learned avail nothing, nor the practice of the virtuous, nor the certainty of the inference of the cauſe from the effect, nor the faith of nations, nor the accompliſhment of prophecy, nor the demonſtration of miracles, nor the blood and teſtimony of 10,000 martyrs."

* *To* CHRISTIANIZE. *v. a.* [from *chriſtian.*] To make chriſtian; to convert to chriſtianity.—

* CHRISTIANLY. *adv.* [from *chriſtian.*] Like a chriſtian; as becomes one who profeſſes the holy religion of Chriſt.

CHRISTIANOPLE, a port town of Sweden, ſituated on the Baltic Sea, in the territory of Blecking, and provinces of South Gothland, 13 miles NE. of Carlſcrona. Lon. 15. 47. E. Lat. 57. 26. N.

CHRISTIANSBURG, a town of Virginia, and the capital of Montgomery county, ſeated near the W. ſide of a branch of Little river, which falls into the Kenhawa. It has a court-houſe and a jail, and a court is held in it monthly. It is 200 miles WSW. of Richmond, and 478 of Philadelphia: from which it lies in Lon. 5. 35. W. Lat. 37. 5. N.

CHRISTIANSTADT, a ſtrong fortified town of Sweden, ſituated in the territory of Blecking and province of South Gothland. It was built in 1614 by Chriſtian IV. king of Denmark, when this province belonged to the Danes; and finally ceded to the Swedes by the peace of Roſkild in 1658. The town is ſmall, but neatly built, and is eſteemed the ſtrongeſt fortreſs in Sweden. The houſes are all of brick, and moſtly ſtuccoed white. It ſtands in a marſhy plain cloſe to the river Helgea, which flows into the Baltic at Ahus, about the diſtance of 20 miles, and is navigable only for ſmall craft of ſeven tons burthen. Engliſh veſſels annually reſort to this port for alum, pitch, and tar. The inhabitants have manufactures of cloth and ſilken ſtuffs, and carry on a ſmall degree of commerce. Lon. 14. 40. E. Lat. 56. 25. N.

CHRISTIGNETH, a river in Denbighſhire.

(1.) CHRISTINA Alexandra, daughter of Guſtavus Adolphus king of Sweden, was born in 1626; and ſucceeded to the crown in 1633, when only 7 years of age. This princeſs diſcovered even in her infancy, what ſhe afterwards expreſſed in her memoirs, an invincible antipathy for the employments and converſation of women; and ſhe had the natural aukwardneſs of a man with reſpect to all the little works which generally fall to their ſhare. She was fond of violent exerciſes, and ſuch amuſements as conſiſt in feats of ſtrength and activity. She had alſo both ability and taſte for abſtracted ſpeculations; and amuſed herſelf with language and the ſciences, particularly that of legiſlature and government. She derived her knowledge of ancient hiſtory from its ſource; and Polybius and Thucydides were her favourite authors. As ſhe was the ſovereign of a powerful kingdom, moſt of the princes in Europe aſpired to her bed. Among her ſuitors were the prince of Denmark, the Elector Palatine, the Elector of Brandenburg, the King of Spain, the

King of the Romans, Don John of Auſtria; Sigiſmund of Rokocci, count and general of Caſſovia; Staniſlaus King of Poland; John Caſimir his brother; and Charles Guſtavus duke of Deuxs Ponts, ſon of the great Guſtavus's ſiſter, and conſequently her firſt couſin. To this nobleman, as well as to all his rivals ſhe refuſed her hand; but ſhe cauſed him to be appointed her ſucceſſor by the ſtates. Political intereſts, differences of religion, and contrariety of manners, furniſhed Chriſtina with pretences for rejecting all her ſuitors; but her true motives were the love of independence, and a ſtrong averſion ſhe had conceived, even in her infancy, from the marriage yoke. "Do not force me to marry (ſaid ſhe to the ſtates,) for if I ſhould have a ſon, it is not more probable that he ſhould be an Auguſtus than a Nero." An accident happened in the beginning of her reign which gave her a remarkable opportunty of diſplaying the ſtrength and equanimity of her mind. As ſhe was at the chapel of the caſtle of Stockholm, aſſiſting at divine ſervice with the principal lords of her court, a poor wretch, who was diſordered in his mind, came to the place with a deſign to aſſaſſinate her. This man, who was in the full vigour of his age, choſe, for the execution of his deſign, the moment in which the aſſembly was performing what in the Swediſh church is called an *act of recollection*; a ſilent and ſeparate act of devotion, performed by each individual kneeling and hiding the face with the hand. Taking this opportunity, he ruſhed through the crowd, and mounted a balluſtrade within which the queen was upon her knees. The Baron Braki, chief juſtice of Sweden, was alarmed, and cried out; and the guards croſſed their partiſans, to prevent his coming further: but he ſtruck them furiouſly on one ſide; leaped over the barrier; and being then cloſe to the queen, made a blow at her with a knife which he had concealed without a ſheath in his ſleeve. The queen avoided the blow, and puſhed the captain of her guards, who inſtantly threw himſelf upon the aſſaſſin, and ſeized him by the hair. All this happened in a moment. The man was known to be mad, and therefore nobody ſuppoſed he had any accomplices: they therefore contented themſelves with locking him up; and the queen returned to her devotion without the leaſt emotion. One of the great affairs that employed Chriſtina, while ſhe was upon the throne, was the peace of Weſtphalia, in which many claſhing intereſts were to be reconciled, and many claims to be aſcertained. It was concluded in Oct. 1648. The ſucceſs of the Swediſh arms rendered Chriſtina the arbitreſs of this treaty; at leaſt as to the affairs of Sweden, to which this peace confirmed the poſſeſſion of many important countries. No public event of importance took place during the reſt of Chriſtina's reign; for there were neither wars abroad, nor troubles at home. This quiet might be the effect of chance; but it might alſo be the effect of a good adminiſtration, and the great reputation of the queen; and the love her people had for her ought to lead us to this determination. Her reign was that of learning and genius. She drew about her, wherever ſhe was, all the diſtinguiſhed characters of her time: Grotius, Paſcal, Bochart, Deſcartes, Gaſſendi, Saumaiſe, Naude, Voſſius, Heinſius, Meibom, Scudery, Menage, Lucas. Holſtenius, Lambecius, Bayle, madam Dacier, Filicaia, and many others. The arts never fail to immortalize the prince who protects them; and almoſt all theſe illuſtrious perſons have celebrated Chriſtina, either in poems, letters, or other literary productions: which form a general maſs of teſtimonials, that may be conſidered as a ſolid baſis of reputation. Chriſtina, however, may be juſtly cenſured with want of taſte, in not properly diſtinguiſhing merit; particularly the ſuperiority of Deſcartes, whom ſhe diſguſted, and at laſt wholly neglected. The rapid fortune which the adventurer Michon, known by the name BOURDELOT, acquired by her countenance and liberality, was alſo a great ſcandal to literature. He had no pretenſions to learning; and though ſprightly, was yet indecent. He was brought to court by the learned Saumaiſe; and, for a time, drove literary merit out of it, making learning the object of his ridicule, and exacting from Chriſtina an exorbitant tribute to the weakneſs and inconſtancy of her ſex; for with reſpect to this man, ſhe ſhewed herſelf to be weak and inconſtant. At laſt ſhe was compelled, by the public indignation, to baniſh this unworthy minion; and he was no ſooner gone, than her regard for him was at an end. She was aſhamed of the favour ſhe had ſhown him; and, in a ſhort time, thought of him with hatred and contempt. This Bourdelot, during his aſcendancy over the queen, had ſupplanted count Magnus de la Gardie, ſon of the conſtable of Sweden, who was a relation, a favourite, and perhaps the lover of Chriſtina. M. de Motteville, who had ſeen him ambaſſador in France, ſays, in his memoirs, that he ſpoke of his queen in terms ſo paſſionate and reſpectful, that every one concluded his attachment to her to be more ardent and tender, than a mere ſenſe of duty can produce. This nobleman fell into diſgrace becauſe he ſhewed an inclination to govern; while M. Bourdelot ſeemed to aim at nothing more than to amuſe; and concealed, under the unſuſpected character of a droll, the real aſcendancy which he exerciſed over the queen's mind. About this time, an accident happened to Chriſtina, which brought her into ſtill greater danger, than that which has already been related. Having ordered ſome ſhips of war to be built at the port of Stockholm, ſhe went to ſee them when finiſhed; and as ſhe was going on board, acroſs a narrow plank, with admiral Fleeming, his foot ſlipping, he fell, and drew the queen with him into the ſea, which in that place was near 90 feet deep. Anthony Steinberg, the queen's firſt equerry, inſtantly threw himſelf into the water, laid hold of her robe, and, with ſuch aſſiſtance as was given him, got the queen aſhore; during the time of this accident, her recollection was ſuch, that the moment her lips were above water, ſhe cried, "Take care of the admiral." When ſhe was got out of the water, ſhe diſcovered no emotion either by her geſture or countenance; and ſhe dined the ſame day in public, where ſhe gave a humourous account of her adventure. But, though at firſt ſhe was fond of the power and ſplendor of royalty, yet ſhe began at length to feel that it embarraſſed her; and the ſame love of independence, which had determined her againſt marriage, at length made her weary of her crown. At laſt ſhe reſolved to abdicate; and, in 1652, communicated her reſolution to the ſenate The ſenate zealouſly remonſtrated againſt it, and were joined by the people; and even by Charles Guſtavus himſelf, who was to ſucceed her: ſhe yielded to their importunities, and continued to ſacrifice her own pleaſure to the will of the public, till 1654, when ſhe carried her deſign into execution. It appears by one of her letters to M. Canut, in whom ſhe put great confidence, that ſhe had meditated this project for more than 8 years; and that ſhe had communicated it to him 5 years before it took place. The ceremony of her abdication was a mournful ſolemnity, a mixture of pomp and ſadneſs, in which ſcarce any eyes but her own were dry. She continued firm and compoſed through the whole; and as ſoon as it was over, prepared to remove into a country more favourable to ſcience than Sweden was. Concerning the merit of this action, the world has always been divided in opinion; it has been condemned alike both by the ignorant and the learned, the trifler and the ſage. It was admired, however, by the great Conde: "How great was the magnanimity of this princeſs (ſaid he,) who could ſo eaſily give up that for which the reſt of mankind are continually deſtroying each other, and which ſo many throughout their whole lives purſue without attaining!" It appears, by the works of St Evremond, that the abdication of Chriſtina was at that time the univerſal topic of ſpeculation and debate in France. Chriſtina, beſides abdicating her crown, abjured her religion; an act univerſally approved by one party and cenſured by another; the Papiſts triumphed, and the Proteſtants were offended. No prince, after a long impriſonment, ever ſhewed ſo much joy upon being reſtored to his kingdom, as Chriſtina did in quitting hers. When ſhe came to a little brook, which ſeparates Sweden from Denmark, ſhe got out of her carriage; and leaping to the other ſide, cried out in a tranſport of joy, "At laſt I am free, and out of Sweden, whither, I hope, I ſhall never return." She diſmiſſed her women, and laid aſide the habit of her ſex: "I would become a man (ſaid ſhe;) yet I do not love men becauſe they are men, but becauſe they are not women." She made her abjuration at Bruſſels: where ſhe ſaw the great Conde, who, after his defection, made that city his aſylum. "Couſin, (ſaid ſhe,) who would have thought, ten years ago, that we ſhould have met at this diſtance from our countries?"—The inconſtancy of Chriſtina's temper appeared in her going continually from place to place: from Bruſſels ſhe went to Rome; from Rome to France, and from France ſhe returned to Rome again; after this ſhe went to Sweden, where ſhe was not very well received; from Sweden ſhe went to Hamburgh, where ſhe continued a year, and then went again to Rome; from Rome ſhe returned to Hamburgh; and again to Sweden, where ſhe was ſtill worſe received than before; upon which ſhe went back to Hamburgh, and from Hamburgh again to Rome. She intended another journey to Sweden; but it did not take place, any more than an expedition to England, where Cromwell did not ſeem well diſpoſed to receive her; and after many wanderings, and many purpoſes of wandering ſtill more, ſhe at laſt died at Rome, in 1689. Her journeys to Sweden, however, had motives of neceſſity; for her appointments were very ill paid, though the ſtates often confirmed them after her abdication: but to other places ſhe was led merely by a roving diſpoſition; and, what is more to her diſcredit, ſhe always diſturbed the quiet of every place ſhe came into, by exacting greater deference to her rank as queen than ſhe had a right to expect, after reſigning it; by her total non-conformity to the cuſtoms of the place, and by continually exciting and fomenting intrigues of ſtate. She was indeed always too buſy, even when ſhe was upon the throne; for there was no event in Europe in which ſhe was not ambitious of acting a principal part. During the troubles in France, by the faction called the *Fronde*, ſhe wrote with great eagerneſs to all the intereſted parties, officiouſly offering her mediation to reconcile their intereſts, and calm their paſſions, the ſecret ſprings of which it was altogether impoſſible ſhe ſhould know. This was firſt thought a dangerous, and afterwards a ridiculous behaviour. During her reſidence in France ſhe gave univerſal diſguſt, not only by violating all the cuſtoms of the country, but by practiſing others directly oppoſite. She treated the ladies of the court with the greateſt rudeneſs: when they came to embrace her, ſhe, being in man's habit, cried out, "What a ſtrange eagerneſs have theſe women to kiſs me! Is it becauſe I look like a man?" But though ſhe ridiculed the manners of the French court, ſhe was very ſolicitous to enter into its intrigues. Louis XIV. then very young, was enamoured of Mademoiſelle de Mancini, niece to cardinal Mazarine. Chriſtina flattered their paſſion, and offered her ſervice. "I would fain be your confident: (ſaid ſhe,) if you love, you muſt marry." The murder of Monaldeſchi is, to this hour, an inſcrutable myſtery. It is, however, of a piece with the expreſſions conſtantly uſed by Chriſtina in her letters, with reſpect to thoſe with whom ſhe was offended; for ſhe ſcarce ever ſignified her diſpleaſure without threatening the life of the offender. "If you fail in your duty, (ſaid ſhe to her ſecretary, whom ſhe ſent to Stockholm after her abdication,) not all the power of the king of Sweden ſhall ſave your life, though you ſhould take ſhelter in his arms." A muſician having quitted her ſervice for that of the duke of Savoy, ſhe was ſo tranſported with rage as to diſgrace herſelf by theſe words, in a letter written with her own hand: "He lives only for me; and if he does not ſing for me, he ſhall not ſing long for any body." Bayle was alſo threatened for having ſaid that the letter which Chriſtina wrote, upon the revocation of the edict of Nantes, was "a remain of Proteſtantiſm;" but he made his peace by apologies and ſubmiſſion. See BAYLE. Upon the whole, ſhe appears to have been an uncommon mixture of faults and great qualities; which, however they might excite fear and reſpect, were by no means amiable. She had wit, taſte, parts, and learning: ſhe was indefatigable upon the throne; great in private life; firm in miſfortunes; impatient of contradiction; and, except in her love of letters, inconſtant in her inclinations. The moſt remarkable inſtance of this fickleneſs is, That after ſhe had abdicated the crown of Sweden, ſhe intrigued for that of Poland. She was, in every action and purſuit, violent and ardent in the higheſt degree; impetuous in her deſires, dreadful in her reſentment, and fickle in her conduct. She ſays of herſelf, that "ſhe was miſtruſtful, ambitious, paſſionate, haughty, impatient, contemptuous, ſatyrical, incredulous, undevout, of an ardent and violent temper, and extremely amorous;" a diſpoſition, however, to which, if ſhe may be believed, her pride and her virtue were always ſuperior. In general, her failings were thoſe of her own ſex, and her virtues thoſe of the other ſex.

(2.) CHRISTINA, ST, one of the MARQUESAS ISLANDS in the South Sea. Lon. 132. 9. W. Lat. 9. 56. S.

(1.) * CHRISTMAS. [from *Chriſt* and *maſs*.] The day on which the nativity of our bleſſed Saviour is celebrated, by the particular ſervice of the church.

(2.) CHRISTMAS is obſerved on the 25th of Dec. As to the antiquity of this feſtival, the firſt footſteps we find of it are in the 2d century, about the time of the emperor Commodus. The decretal epiſtles indeed carry it up a little higher; and ſay that Teleſphorus, who lived in the reign of Antoninus Pius, ordered divine ſervice to be celebrated, and an angelical hymn to be ſung, the night before the nativity of our Saviour. That it was kept before the time of Coſtantine we have a melancholy proof: for whilſt the perſecution raged under Diocleſian, who then kept his court at Nicomedia, that tyrant among other acts of cruelty, finding multitudes of Chriſtians aſſembled together to celebrate Chriſt's nativity, commanded the church doors where they were met to be ſhut, and fire to be put to it, which ſoon reduced them and the church to aſhes.

(3.) * CHRISTMAS-BOX. *n. ſ.* [from *chriſtmas* and *box*.] A box in which little preſents are collected at Chriſtmas.

(4.) * CHRISTMAS-FLOWER. *n. ſ.* Hellebore.

(5.) CHRISTMAS ISLAND, an iſland nearly in the centre of the Pacific Ocean, ſo named by Captain Cook, on account of his firſt landing there on Chriſtmas-day. It is 45 miles in circumference; bounded by a reef of coral rocks, on the W. ſide of which is a bank of fine ſand, extending a mile into the ſea, and affording good anchorage. The ſoil, in ſome places, is light and black, compoſed of decayed vegetables, the dung of birds, and ſand: in others, nothing but broken corals and ſhells are to be ſeen. No freſh water was found by digging. The vegetable productions are only a few cocoa nut trees, and ſome low trees, ſhrubs, and plants, ſuch as are found on other iſlands of the ſame appearance, in a ſoil half formed. It is frequented by ſeveral ſorts of birds, and plenty of fiſh and turtles are found on its coaſt. Lon. 157. 30. W. Lat. 1. 59. N.

(6.) CHRISTMAS ROSE. See HELLEBORUS.

(1.) CHRISTOPHER, HERB. See ACTÆA.

(2.) CHRISTOPHER, ST, a river on the E. coaſt of Africa, which falls into the Eaſtern Ocean, at Terra de Natal.

CHRISTOPHERSON, John, a learned Engliſh biſhop of the 16th century, born in Lancaſhire, educated at Cambridge, and one of the firſt fellows of Trinity College. In 1554, he was made dean of Norwich, but in the reign of Edward VI. he lived abroad in a ſtate of exile. On the acceſſion of Mary I. he returned, and was made biſhop of Chicheſter. He died a ſhort time before that bloody monarch. He tranſlated *Philo Judæus* into Latin, and the eccleſiaſtical hiſtories of Euſebius, Socrates, Sozomen, Evagrius, and Theodoret; but his tranſlations are cenſured as not only barbarous in ſtyle, but as defective, erroneous, and deranged. He is accuſed of acting the commentator rather than the tranſlator; of enlarging, retrenching, and tranſpoſing at pleaſure, and altering not only the ſenſe, but even the chapters of his authors. Hence Baronius and others, who have truſted to his tranſlations, have been led into great miſtakes.

CHRISTOPHER'S, ST, or ST KIT'S, one of the Caribbee iſlands. See KIT'S, ST.

CHRIST, ORDERS OF. i. A military order, founded by Dionyſius I. King of Portugal, to animate his nobles againſt the Moors.—The arms of this order are gules, patriarchal croſs, charged with another croſs argent: they had their reſidence, firſt, at Caſtromarim, afterwards at Thomar; which was near to the Moors of Andaluſia and Eſtremadura. ii. Another military order in Livonia, inſtituted in 1205, by Albert, biſhop of Riga, to defend the new Chriſtians, who were daily converted in Livonia, but perſecuted by the heathens. They wore on their cloaks a ſword with a croſs over it, whence they were alſo denominated *brothers of the ſword*.

(1.) * CHRIST'S-THORN. *n. ſ.* [So called, as *Skinner* fancies, becauſe the thorns have ſome likeneſs to a croſs.] A plant.—It hath long ſharp ſpines: the flower has 5 leaves, in form of a roſe: out of the flower-cup, which is divided into ſeveral ſegments, riſes the pointal, which becomes a fruit, ſhaped like a bonnet, having a ſhell almoſt globular, which is divided into 3 cells, in each of which is contained a roundiſh ſeed. This is by many perſons ſuppoſed to be the plant from which our Saviour's crown of thorns was compoſed. *Miller.*

(2.) CHRIST'S THORN. See RHAMNUS.

CHROASTACES, in natural hiſtory, a genus of pellucid gems, comprehending all thoſe of variable colours, as viewed in different lights; of which kinds are the *opal* and the *aſteria* or *oculus cati*. See OPAL, and ASTERIA.

(1.) CHROMA, [χρῶμα, colour,] in muſic, a graceful manner of ſinging.

(2.) CHROMA, in rhetoric, a colouring, or elegance of expreſſion.

(1.) CHROMATIC, a kind of muſic which proceeds by ſeveral ſemitones in ſucceſſion. For this denomination ſeveral cauſes are aſſigned, of which the following appears to be the moſt ſatisfactory. Χρωμα may ſignify that ſhade of a colour by which it melts into another, or what the French call *nuance*. In this ſenſe it will apply to ſemi-tones, which, being the ſmalleſt intervals allowed in the diatonic ſcale, will moſt eaſily run one into another. To find the reaſons aſſigned by the ancients for this denomination, and their various diviſions of the chromatic ſpecies, the reader may have recourſe to the ſame article in Rouſſeau's Muſical Dictionary. At preſent, that ſpecies conſiſts in giving ſuch a procedure to the fundamental baſs, that the parts in the harmony, or at leaſt ſome of them, may proceed by ſemitones, as well in riſing as deſcending; which is moſt frequently found in the minor mode, from the alteration to which the 6th and 7th note are ſubjected, by the nature of the mode itſelf. The ſucceſſive ſemi-tones uſed in the chromatic ſpecies are rarely of the ſame kind; but alternatively major and minor, that is to ſay, *chromatic* and *diatonic:* for the interval of a minor tone contains a minor or chromatic ſemitone, and another which is major or diatonic; a meaſure which temperament renders common to all tones: ſo that we cannot proceed by two minor ſemitones which are conjunctive in ſucceſſion, without entering into the enharmonic ſpecies; but two major ſemitones twice follow each other in the *chromatic* order of the ſcale. The moſt certain procedure of the fundamental baſs to generate the chromatic elements in aſcent, is alternately to deſcend by thirds, and riſe by fourths, whilſt all the chords carry the third major. If the fundamental baſs proceeds from dominant to dominant by perfect cadences avoided, it produces the *chromatic* in deſcending. To produce both at once, interweave the perfect and broken cadences, but at the ſame time avoid them. As at every note in the chromatic ſpecies one muſt change the tone, that ſucceſſion ought to be regulated and limited to prevent deviation. For this purpoſe, the ſpace moſt ſuitable to chromatic movements, is between the extremes of the dominant and the tonic in aſcending, and between the tonic and the dominant in deſcending. In the major mode, one may alſo chromatically deſcend from the dominant upon the 2d note. This tranſition is very common in Italy; and, notwithſtanding its beauty, begins to be a little too common amongſt us. The chromatic ſpecies is admirably fitted to expreſs grief and affliction: theſe ſounds boldly ſtruck in aſcending, tear the ſoul. Their power is no leſs magical in deſcending; it is then that the ear ſeems to be pierced with real groans. Attended with its proper harmony this ſpecies appears proper to expreſs every thing: but its completion, by concealing the melody, ſacrifices a part of its expreſſion; and for this diſadvantage, ariſing from the fulneſs of the harmony, it can only be compenſated by the nature and genius of the movement.

(2.) Chromatic, Enharmonic. See Enharmonic.

(3.) * Chromatick. *adj.* [χρωμα, colour.] 1. Relating to colour.—I am now come to the third part of painting, which is called the *chromatick*, or colouring. *Dryden.* 2. Relating to a certain ſpecies of ancient muſick, now unknown.—It was obſerved he never touched his lyre in ſuch a truly *chromatick* and enharmonick manner. *Arbuth. and Pope.*

CHROMATICS.

Definition.

(1.) CHROMATICS, a branch of optics, which explains the ſeveral properties of the colours of light and of natural bodies.

Sect. I. Various opinions respecting colours.

(2.) Previous to the time of Sir Iſaac Newton, we find no hypotheſis concerning colours of any conſequence. The Pythagoreans called colour the ſuperficies of body. Plato ſaid that it was a flame iſſuing from them. According to Zeno, it is the firſt configuration of matter; and Ariſtotle ſaid it was that which moved bodies actually tranſparent.

(3.) Deſcartes aſſerted, that colour is a modification of light; but he imagined, that the difference of colour proceeds from the prevalence of the direct or rotatory motion of the particles of light. Father Grimaldi, Dechales, and many others, thought the differences of colour depended upon the quick or ſlow vibrations of a certain elaſtic medium filling the whole univerſe. Rohault imagined, that the different colours were made by the rays of light entering the eye at different angles with reſpect to the optic axis.

(4.) Laſtly, Dr Hooke imagined that colour is cauſed by the ſenſation of the oblique or uneven pulſe of light; which being capable of no more than two varieties, he concluded there could be no more than two primary colours.

Sect. II. Outlines of Sir Isaac Newton's theory of colours.

(5.) In 1666, Sir Iſaac Newton began to inveſtigate this ſubject; and finding the coloured image of the ſun, formed by a glaſs priſm, to be of an oblong, and not of a circular form, as, according to the laws of refraction, it ought to be, he began to conjecture that light is not *homogeneal;* but that it conſiſts of rays of different colours, and endued with different degrees of refrangibility; and from a further proſecution of his experiments, he concluded, that the different colours of bodies ariſe from their reflecting this or that kind of rays moſt copiouſly. See this diſcovery fully explained and aſcertained under the article Optics.

(6.) This method of accounting for the different colours of bodies, is ſo eaſy and natural, that it quickly overcame all objections, and continues to be almoſt univerſally believed.

(7.) It is now acknowledged, that the light of the ſun, which to us ſeems perfectly homogeneal and white, is compoſed of 7 different colours, viz. red, orange, yellow, green, blue, purple, and violet or indigo. A body which appears of a red colour, hath the property of reflecting the red rays more powerfully than any of the others; and ſo of the orange, yellow, green, &c. A body which is of a black colour, inſtead of reflecting, *abſorbs* all or the greateſt part of the rays that fall upon it; and, on the contrary, a body which appears white, reflects the greateſt part of the rays in indiſcriminately, without ſeparating them from one another.

Sect. III. Of the Separation of the Rays of Light by Reflection or Transmission.

(8.) The foundation of a rational theory of colours being thus laid, it next became natural to inquire, by what peculiar mechaniſm in the ſtructure of each particular body it was fitted to reflect one kind of rays more than another? This Sir Iſaac Newton attributes to the denſity of theſe bodies. Dr Hooke had remarked, that thin tranſparent ſubſtances, particularly water and ſoap blown into bubbles, exhibited various colours according to the thinneſs; though, when they have a conſiderable degree of thickneſs, they appear colourleſs; and Sir Iſaac himſelf had obſerved, that as he was compreſſing two priſms hard together, in order to make their ſides (which happened to be a little convex) to touch one another, in the place of contact they were both perfectly tranſparent, as if they had been but one continued piece of glaſs: But round the point of contact, where the glaſſes were a little ſeparated from each other, rings of different colours appeared.

(9.) To obſerve more nicely, the order of the colours produced in this manner, he placed a glaſs lens, whoſe convexity was ſmall, upon a plain glaſs, and preſſing them together, the colours very ſoon emerged, and appeared diſtinct to a conſiderable diſtance. Next to the pellucid central ſpot, made by the contact of the glaſſes, ſucceeded blue, white, yellow, and red. The blue was very little in quantity, nor could he diſcern any violet in it; but the yellow and red were very copious, extending about as far as the white, and 4 or 5 times as far as the blue. The next circuit immediately ſurrounding theſe, conſiſted of violet, blue, green, yellow, and red: all theſe were copious and vivid, except the green which was very little in quantity, and ſeemed more faint and dilute than the other colours. Of the other 4, the violet was the leaſt in extent: and the blue leſs than the yellow or red. The 3d circle of colours was purple, blue, green, yellow, and red. In this the purple ſeemed more reddiſh than the violet in the former circuit, and the green was more conſpicuous; being as briſk and copious as any of the other colours, except the yellow; but the red began to be a little faded, inclining much to purple. The 4th circle conſiſted of green and red; and of theſe the green was very copious and lively, inclining on the one ſide to blue, and on the other to yellow; but in this 4th circle there was neither violet, blue, nor yellow, and the red was very imperfect and dirty. All the ſucceeding colours grew more and more imperfect and dilute, till after 3 or 4 revolutions they ended in perfect whiteneſs.

(10.) The colours being thus found to vary according to the different diſtances of the glaſs-plates from each other, Sir Iſaac thought that they proceeded from the different thickneſs of the plate of air intercepted between the glaſſes; this plate of air being, by the mere circumſtance of thinneſs or thickneſs, diſpoſed to reflect or tranſmit this or that particular colour. From this he concluded, that the colours of all natural bodies depended on their denſity, or the magnitude of their component particles. He alſo conſtructed a table, wherein the thickneſs of a plate neceſſary to reflect any particular colour was expreſſed in parts of an inch divided into 1,000,000 parts.

(11.) Sir Iſaac Newton, purſuing his diſcoveries concerning the colours of thin ſubſtances, found that the ſame were alſo produced by plates of a conſiderable thickneſs. There is no glaſs or ſpeculum, he obſerves, how well poliſhed ſoever, but, beſides the light which it refracts or reflects regularly, ſcatters every way irregularly a faint light; by means of which the poliſhed ſurface, when illuminated in a dark room by a beam of the ſun's light, may eaſily be ſeen in all poſitions of the eye. It was with this ſcattered light that the colours in the following experiments were produced.

(12.) The ſun ſhining into his darkened chamber through a hole in the ſhutter one inch wide, he let the beam of light fall perpendicularly upon a glaſs ſpeculum concave on one ſide and convex on the other, which was quickſilvered over. Then, holding a quire of white paper at the centre of the ſphere to which the ſpeculum was ground, in ſuch a manner as that the beam of light might paſs through a little hole made in the middle of the paper, to the ſpeculum, and thence be reflected back to the ſame hole, he obſerved on the paper 4 or 5 concentric rings of colours, like rainbows ſurrounding the hole, very much like thoſe which appeared in the thin plates above mentioned, but larger and fainter. Theſe rings, as they grew larger and larger, became more dilute, ſo that the fifth was hardly viſible; and yet ſometimes, when the ſun ſhone very clear, there appeared faint traces of a ſixth and ſeventh.

(13.) We have obſerved above, that the thin plates uſed in the former experiments reflected ſome kind of rays in particular parts, and tranſmitted others in the ſame parts. Hence the coloured rings appeared variouſly diſpoſed, according as they were viewed by tranſmitted or reflected light; that is, according as the plates were held up between the light and the eye, or not. For the better underſtanding of this, we ſubjoin the following table, wherein on one ſide are mentioned the colours appearing on the plates by reflected light, and on the other ſide thoſe which were oppoſite to them, and which became viſible when the glaſſes were held up between the eye and the window. The centre, when the glaſſes were in full contact, was perfectly tranſparent. This ſpot, therefore, when viewed by reflected light, appeared black, becauſe it tranſmitted all the rays; and for the ſame reaſon it appeared white when viewed by tranſmitted light.

(14.) Table of Colours by

Reflected light.	Transmitted light.
Black	White
Blue	Yellowiſh red
White	Black
Yellow	Violet
Red	Blue
Violet	White
Blue	Yellow
Green	Red

Reflected light.	Transmitted light.
Yellow	Violet
Red	Blue
Purple	Green
Blue	Yellow
Green	Red
Yellow } Red }	Bluiſh green
Green	Red
Red	Bluiſh green
Greeniſh blue	Red
Red	

(15.) In comparing the rings produced by tranſmitted light, with thoſe produced by reflected, the white is found oppoſed to the black, the red to the blue, the yellow to the violet, and the green to a colour compoſed of red and violet; in other words, the parts of the glaſs, that, when looked at, are white, appear black on looking through the glaſs; and, on the contrary, thoſe which appear black in the firſt inſtance, appear white in the ſecond; and ſo of the other colours, which will be more readily comprehended by conſidering this figure, where A B, C D, fig. 1. plate LXXIV. repreſent the glaſſes which touch at E; the black lines traced between them are the diſtances between the two ſurfaces, at different diſtances from the centre, each diſtance anſwering to a coloured ring: the colours written above are thoſe ſeen by reflected light, thoſe underneath, are the colours exhibited by tranſmitted light.

(16.) Newton has ſhown, that the rays of any particular colour are diſpoſed to be reflected, when the thickneſſes of the plate of air are as the numbers 1, 3, 5, 7, 9, 11, &c. and that the ſame rays are diſpoſed to be tranſmitted at the intermediate thickneſſes, which are as the numbers 0, 2, 4, 6, 8, 10, &c. The places of reflection or tranſmiſſion of the ſeveral colours in a ſeries, are ſo near each other, that the colours dilute each other by mixture; whence the number of ſeries, in the open day light, ſeldom exceeds 7 or 8. But if the ſyſtem be viewed through a priſm, by which means the rings of various colours are ſeparated, according to their refrangibility, they may be ſeen on that ſide towards which the refraction is made, ſo numerous that it is impoſſible to count them. Or, if in a dark chamber the ſun's light be ſeparated into its original rays, by a priſm, and a ray of one uncompounded colour be received upon the two glaſſes, the number of circles will become very numerous, and both the reflected and tranſmitted light will remain of the ſame colour as the original incident ray.

(17.) This experiment ſhews, that in any ſeries, the circles formed by the leſs refrangible rays exceed, in magnitude, thoſe which are formed by the more refrangible; and, conſequently, that in any ſeries, the more refrangible rays are reflected at leſs thickneſſes than thoſe which are leſs refrangible. If we apply water to the edges of the glaſs, it will be attracted between them; and, filling all the intercedent ſpace, it will become a thin plate of the ſame dimenſions as that which before was conſtituted of air: in this caſe, the circular rings grow leſs, and the colours fainter, but not varied in ſpecies. They become contracted in diameter, nearly in the proportion of 7 to 8, and conſequently the intervals of the glaſſes, at ſimilar circles, as cauſed by theſe two mediums, are as about 3 to 4; that is, as the ſines of refraction out of water into air.

(18.) As the colours produced by bubbles blown in ſoap-water, are commonly too much agitated by the external air to admit of any certain obſervation, it is neceſſary to cover the bubble with a clear glaſs, in which ſituation the following appearances take place: the colours emerge from the top of the bubble, and as it grows thinner, by the ſubſidence of the water, they dilate into rings parallel to the horizon, which deſcend ſlowly, and vaniſh ſucceſſively, at the bottom. This emergence continues till the water at the upper part of the bubble becomes too thin to reflect the light, at which time a circle of an intenſe blackneſs appears at the top, which ſlowly dilates, ſometimes to $\frac{1}{4}$ of an inch in breadth, before the bubble breaks. Reckoning from the black central ſpot, the reflected colours are the ſame, in ſucceſſion and quality, as thoſe produced by the plate of air; and the appearance of the bubble, if viewed by tranſmitted light, is ſimilar to that of the plate of air, in like circumſtances.

(19.) The colours of the rings produced from reflection by the thick plates, followed the order of thoſe produced by tranſmiſſion through the thin ones; and by the analogy of their phenomena with thoſe produced from the thin plates, Sir Iſaac Newton concluded that they were produced in a ſimilar manner. For he found, that if the quickſilver was rubbed off from the back of the ſpeculum, the glaſs alone would produce the ſame rings, but much more faint than before; ſo that the phenomenon did not depend upon the quickſilver, except in as far as, by increaſing the reflection at the back of the glaſs, it increaſed the light of the coloured rings. He alſo found that a ſpeculum of metal only, produced none of thoſe rings; which made him conclude, that they did not ariſe from one ſurface only, but depended on the two ſurfaces of the plate of glaſs of which the ſpeculum was made, and upon the thickneſs of the glaſs between them.

(20.) From theſe experiments and obſervations, it will be eaſy to underſtand the Newtonian theory of colours. Every ſubſtance in nature ſeems to be tranſparent, provided it is made ſufficiently thin. Gold, the moſt denſe ſubſtance we know, when reduced into thin leaves, tranſmits a bluiſh-green light through it. If, therefore, we ſuppoſe any body, gold, for inſtance, to be divided into a vaſt number of plates, ſo thin as to be almoſt perfectly tranſparent, it is evident that all, or greateſt part of the rays will paſs through the upper plates, and when they loſe their force will be reflected from the under ones. They will then have the ſame number of plates to paſs through, which they had penetrated before; and thus, according to the number of thoſe plates through which they are obliged to paſs, the object appears of this or that colour, juſt as the rings of colours appeared different in the experiment of the two plates, according to their diſtance from one another, or the thickneſs of the plate of air between them.

(21.) Mr Edward Huſſey Delaval, has adopted

CHROMATICS.

Fig. 1.

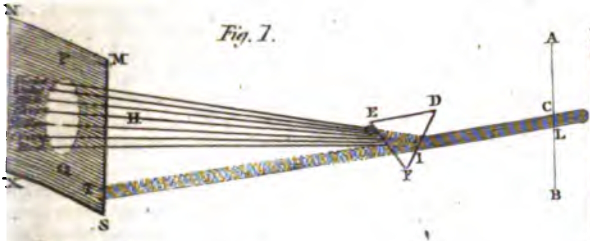


Fig. 2.

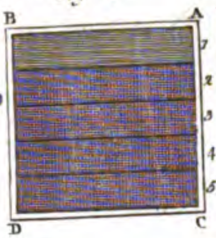


Fig. 3.

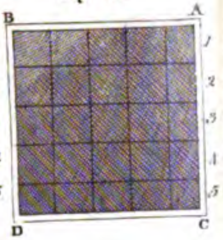


Fig. 4.

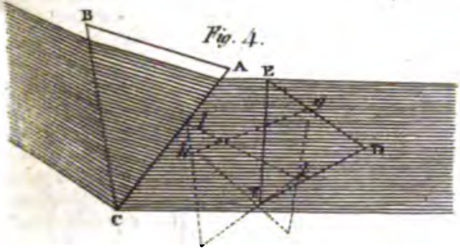


Fig. 5.

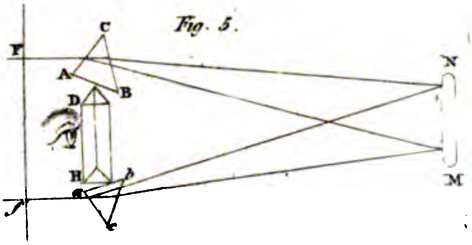


Fig. 7.

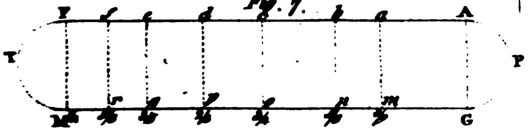


Fig. 8.

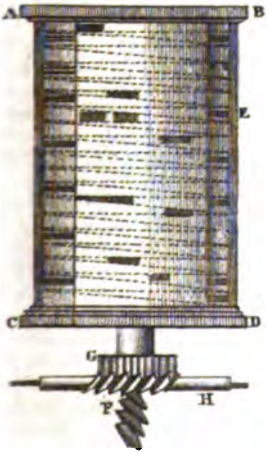


Fig. 6.

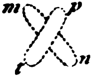


Fig. 10.
Chryſomela.

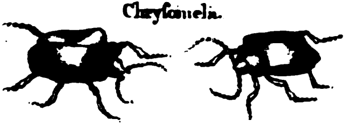


Fig. 9.

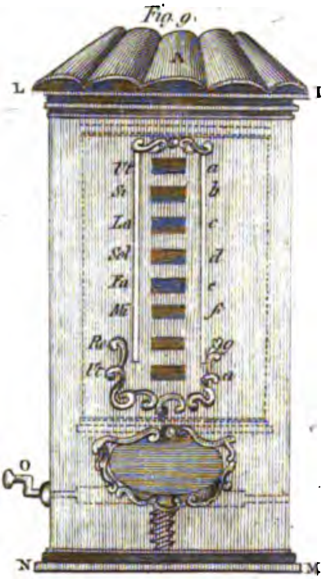
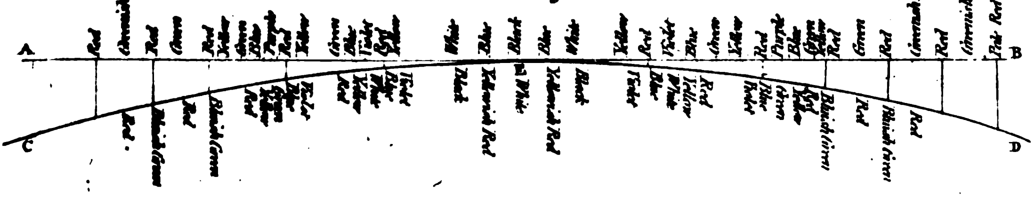


Fig. 11.
Chromatic Rings



this theory in his *Experimental Inquiry into the cauſe of the changes of colours in opaque and coloured bodies.* He endeavours to confirm it by a number of experiments on the infuſions of flowers of different colours; but his ſtrongeſt arguments ſeem to be thoſe derived from the different tinges given to glaſs by metallic ſubſtances. Here he obſerves, that each metal gives a tinge according to its ſpecific denſity; the more denſe metals producing the leſs refrangible colours, and the lighter ones thoſe colours which are more eaſily refrangible.

(22.) Gold, which is the denſeſt of all metals, imparts a red colour to glaſs, whenever it can be divided into particles ſo minute, that it is capable of being mixed with the materials of which glaſs is made. Lead, the metal whoſe denſity is next in order to that of gold, affords a glaſs of the colour of the hyacinth; a gem whoſe diſtinguiſhing characteriſtic is, that it is red with an admixture of yellow, the ſame colour which is uſually called *orange*. Silver, next in denty to lead, can only be made to communicate a yellow colour to glaſs. Leaf ſilver laid upon red hot glaſs likewiſe tinges it yellow. The only colour produced by copper is green, and iron the metal next in denſity to copper, imparts a blue colour.

(23.) Theſe are the principal of Mr Delaval's arguments in favour of Sir Iſaac Newton's theory of colours being formed by denſity. Dr PRIESTLEY too hath mentioned ſome which deſerve attention. "This great diſcovery, (ſays he) concerning the colours of bodies depending on the thickneſs of the fine plates which compoſe their ſurfaces, of whatever denſity theſe plates may be, I have been ſo happy as to hit upon a method of illuſtrating and confirming by means of electrical exploſions. A number of theſe being received on the ſurface of any piece of metal, change the colour of it to a conſiderable diſtance from the ſpot on which they were diſcharged; ſo that the whole circular ſpace is divided into a number of concentric rings, each of which conſiſt of all the priſmatic colours, and perhaps as vived as they can be produced in any method whatever.

(24.) Upon ſhewing theſe coloured rings to Mr Canton, I was agreeably ſurpriſed to find, that he had likewiſe produced all the priſmatic colours from all the metals, but by a different operation. He extended fine wires of all the different metals along the ſurfaces of pieces of glaſs, ivory, wood, &c. and when the wire was exploded, he always found them tinged with all the colours. They are not diſpoſed in ſo regular and beautiful a manner as in the rings I produced, but they equally demonſtrate that none of the metals thus exploded diſcovers the leaſt preference to one colour more than to another. In what manner theſe colours are formed it may not be eaſy to conjecture. In Mr Canton's method of producing them, the metal, or the calcined and vitrified parts of it, ſeem to be diſperſed in all directions from the plate of exploſion, in the form of ſpheres of a very great variety of ſizes, tinged with all the variety of colours and ſome of them ſmaller than can be diſtinctly ſeen by any magnifier. In my method of making theſe colours, they ſeem to be produced in a manner ſimilar to the production of colours on ſteel and other metals by heat; *i. e.* the ſurface is affected without the parts of it being removed from their places, certain plates or laminæ being formed of a thickneſs proper to exhibit the reſpective colours."

SECT. IV. EXPERIMENTS *and* HYPOTHESES *of Meſſrs* MAZEAS *and* DU TOUR.

(25.) However plauſible the Newtonian theory of colours may be, it has been oppoſed by the Abbe MAZEAS, and M. DU TOUR. The former of theſe gentlemen, endeavouring to give a very high poliſh to the flat ſide of an object glaſs, by rubbing it againſt another piece of flat and ſmooth glaſs, found that after this friction they adhered firmly together, and that there were produced between them colours ſimilar to thoſe produced in Newton's experiments, by preſſing together a convex and plane glaſs.

(26.) In the Abbe's experiments, red and green curve lines were obſerved to ariſe, and increaſe in number, in proportion to the adheſion of the glaſſes, between which they were produced. Sometimes they were mixed without any order, and ſometimes diſpoſed in the manner of concentric circles, or ovals; in the middle of which, there appeared a ſmall plate of the ſame figure, exactly like a plate of gold between the glaſſes. In the centre of this plate, there was often a dark ſpot, which abſorbed all the rays of light except the violet. To produce the preceding appearance, the glaſſes required to be well wiped and warmed before the friction: if they were ſeparated ſuddenly, and again put together, the colours appeared without friction, but unleſs in this caſe, they could not be produced by preſſure, the friction no doubt being neceſſary to bring the glaſſes near enough each other.

(27.) The Abbe next procured two priſms with ſmall refracting angles, and joining them ſo as to form a parallelopiped, by friction the colours appeared with great luſtre at the points of contact, owing to the ſeparation of the rays by the priſm. In this experiment, differently coloured ovals appeared, but the gold coloured plate was much whiter, and only yellow about its edges. It had a black ſpot on the middle, and was bordered by a deep purple; a ſmall quantity of violet could be perceived by the help of a lens with a weak light at the extremity of the purple; next ſucceeded blue, orange, red tinged with purple, light green, and faint purple. The other rings appeared to the naked eye to conſiſt of nothing but faint red and green, and ſo ſhaded, that it was not eaſy to mark their terminations.

(28.) By heating the glaſſes while yet in contact, the colours diſappeared; but when they were ſuffered to cool, the colours returned by degrees to their former place. The Abbe at firſt believed, that theſe colours were produced by a thin plate of air interpoſed between the glaſſes, in the manner ſuppoſed by Newton; but the remarkable difference between the circumſtances attending thoſe produced by the flat plates, and thoſe produced by the object glaſſes of Newton, convinced him, that the air was not the cauſe of the appearance. The colours produced between the flat plates vaniſhed at the approach of flame, but thoſe of the lenſes did not, for he even heated the latter, till the glaſs next the flame was cracked by the heat, before he could obſerve the leaſt dilatation of the coloured rings. Afterwards he put both the plane and convex glaſſes under the receiver of an air pump, but could obſerve no change in the colours of either of them, in the moſt perfect vacuum he could make. He acknowledges, however, that the air may adhere ſo obſtinately to the ſurface of the glaſſes, as not to be ſeparated from them by the force of the pump.

(29.) To try the utmoſt effect of heat upon the coloured plates, after warming them gradually, he rubbed them together over burning coals; but though they were nearly red, he obſerved the ſame coloured rings as before; when he ceaſed to preſs upon them the colours vaniſhed, but when he repeated the friction they returned, and continued till the glaſſes began to be red hot, and their ſurfaces to be united by fuſion.

(30.) The Abbe judged from the reſemblance between his experiments, and thoſe of Newton, that the colours were owing to ſome matter, (whatever that was,) interpoſed between the glaſſes. To aſcertain this, he put a ſmall quantity of ſuet between the glaſſes, warming them at the ſame time, but produced no colours by rubbing them as before. However, rubbing them with more violence, in a circular manner, on looking at a candle through them, he ſaw it ſurrounded with two or three concentric rings, very broad, and with very lively colours, at firſt they were only red and green, but continuing the friction, the rings aſſumed the colours of blue, yellow, and violet. If after having rubbed the glaſſes, the thickneſs was conſiderably diminiſhed, the colours grew weaker by tranſmitted light, but became ſtronger by reflection.

(31.) From theſe experiments the Abbe Mazeas draws the following concluſions againſt the truth of the Newtonian hypotheſis. Newton ſuppoſed, that the colour of the plates varied by the difference of the millionth part of an inch in their thickneſs; whereas the Abbe was certain that there muſt have been much greater differences in the diſtances between his glaſſes, while the colour remained unchanged.

(32.) If the colour depended upon the thickneſs only, he thought that the matter interpoſed between the glaſſes ought to have given the ſame colour when it was reduced to a thin plate by ſimple fuſion as well as by friction, and that, in rubbing two plates together, warming them at different times, and compreſſing them with a conſiderable force, other colours would have appeared beſides thoſe above mentioned.

(33.) Theſe circumſtances made him ſuſpect that the different thickneſſes of the ſubſtance interpoſed between the glaſſes ſerved only to make them more or leſs tranſparent, which was an eſſential condition in the experiment: and he imagined that the friction diffuſed over the ſurface of the thin ſubſtance a kind of matter on which the colours are formed by reflected light; for when he held the plates (which gave the colours when the ſuet was between them) over the flame of a ſmall candle, the colours fled with great precipitation, and returned to their place without his being able to perceive the leaſt alteration in the ſuet.

(34.) He was confirmed in his conjectures, by frequently obſerving, that when the glaſſes were ſeparated, at the moment the colours diſappeared, they were covered with the ſame greaſy matter, and that it ſeemed to be in the very ſame ſtate as when they were ſeparated without warming. Beſides, having often repeated the ſame experiment with different kinds of matter, he found that the degrees of heat that diſperſed the colours was not always ſufficient to melt it; which difference was more ſenſible in proportion as the matter interpoſed was made thinner.

(35.) The Abbe found that by uſing Spaniſh wax, reſin, and common wax, nearly the ſame phenomena were produced as when ſuet was uſed. To try the effect of vapour, he breathed upon the glaſs plates, and obſerved, that the vapours which adhered to them, ſometimes formed, before they were entirely diſperſed, a great variety of colours. Putting a drop of water between two pieces of common glaſs, he obſerved that the compreſſion of them produced no colour: but if, while they were compreſſed, the water was made to paſs from one part to another, it left behind it large ſpots, which aſſumed different colours, with a ſurpriſing rapidity.

(36.) To determine with certainty whether they were vapours that cauſed the colours in his firſt obſervations, he firſt breathed upon one of his plates of glaſs, and then rubbed them againſt one another, when the colours appeared in the ſame order as before; but darker, and diſperſed in confuſion in the places occupied by the vapours, but when he diſſipated the watery particles by fire, the colours reſumed their luſtre.

(37.) To aſcertain whether the coloured rings of his glaſſes depended upon the thickneſs of the water only, he dipped one of the edges of his coloured glaſſes in a veſſel of water, having taken care to wipe and warm them well before he produced his colours by friction. The water was a conſiderable time in riſing as high as the glaſſes; and in proportion as it aſcended, he perceived a very thin plate of water, which ſeemed to paſs over the matter which he thought produced the colours, without mixing with it; for beyond this plate of water, he ſtill perceived the colours in the ſame place and order, but deeper and darker; and holding the glaſſes above the flame of a candle, he ſaw the colours go and come ſeveral times, as he moved them nearer to or farther from the flame. He then moiſtened both the glaſſes more than before; and rubbing them as uſual, he always ſaw the ſame appearance; and ſeizing the moment when the colours had diſappeared to ſeparate the glaſſes, he always found they were wet. On this account, he thought that it could not be the water on which the object depended, but ſome ſubſtance much more ſenſible to heat. He alſo thought that theſe coloured rings could not be owing to the compreſſion of the glaſſes: or that, if this circumſtance did contribute any thing to them, it ſerved rather to modify than to generate them.

(38.) M. Du Tour gave particular attention to the obſervations of the Abbe Mazeas; and repeated the experiments with ſome variation, particularly comparing them with thoſe of Sir Iſaac Newton. He is ſo far from ſuppoſing a plate of air to be neceſſary to the formation of theſe coloured rings, that he thinks the reaſon of their not appearing between the flat plates of glaſs is the adhering of the air to their ſurfaces; and that mere preſſure is not ſufficient to expel it; except, as the Abbe Mazeas obſerved, the rings had before been made in the ſame place; in which caſe, ſimple appoſition without friction is ſufficient: the air, probably, not having had time to apply itſelf ſo cloſely to the ſurface of the glaſs. The contact of ſome other ſubſtances, M. du Tour obſerves, is not ſo prejudicial in this experiment as that of air; for he found, that if he only gave the plates a ſlight coating of any kind of greaſe, the rings would appear without friction. Alſo dipping them ſlightly in water, or wiping them with his finger, would anſwer the ſame purpoſe.

Sect. V. Experiments *and* Hypothesis *of the duke* de Chaulnes.

(39.) Sir Iſaac Newton from the obſervations he made on the colours of thin plates, imagined he could account for the colours exhibited by thick ones in ſome caſes in a ſimilar manner; particularly in thoſe curious experiments in which he admitted a beam of light through a hole in a piece of paſteboard and obſerved the rings of colours reflected back upon it by a concave glaſs mirror of equal thickneſs in all places. Theſe experiments were reſumed, and happily purſued, by the Duke De Chaulnes, who aſcribed theſe colours to the inflection of light. Chance led the duke to obſerve, that when the nearer ſurface of the glaſs mirror was clouded by breathing upon it, ſo as lightly to tarniſh it, a white diffuſed and vivid light was ſeen upon the paſteboard, and all the colours of the rings became much ſtronger, and more diſtinct. This appearance he made conſtant by moiſtening the ſurface of the mirror with a little milk and water, and ſuffering it to dry upon it.

(40.) The duke, in all his experiments upon this ſubject, found, that when the rays fell converging on the ſurface of the mirror, the rings were hardly viſible; when they fell parallel upon it, as they muſt have done in all the experiments of Newton, they appeared ſufficiently diſtinct; but when, by means of a convex lens placed in the hole of the window, they were made to diverge from the centre of the ſphere to which the mirror was ground, ſo that they fell perpendicularly on the ſurface of the mirror, the colours were as vivid as he could make them. In this caſe he could remove the reflected image to a great diſtance from the hole, without making the rings diſappear; and he could plainly perceive them to ariſe from their central ſpots, which changed their colours ſeveral times.

(41.) The effect of tarniſhing the mirror convinced him, that theſe coloured rings depended on the firſt ſurface of the mirror; and that the ſecond ſurface, or that which reflected them after they had paſſed the firſt, only ſerved to collect them and throw them upon the paſteboard in a quantity ſufficient to make them viſible, and he was confirmed in his ſuppoſition by the following experiments.

(42.) He took a plano-convex object glaſs, of ſix feet focus, and placed it ſix feet from the paſteboard with its convex ſide towards it. Thus the rays which fell upon that ſurface, after being refracted there, were tranſmitted through the thickneſs of the glaſs, parallel to one another, and fell perpendicularly on the plane ſurface that reflected them, and, in their return, would be collected upon the paſteboard. In theſe circumſtances the rings appeared very diſtinct after he had tarniſhed the convex ſurface, which in this poſition was next to the light. Turning the ſame glaſs the contrary way, ſo that the plane ſurface was towards the paſteboard, he could perceive none of the rings at the diſtance of ſix feet; but they were viſible at the diſtance of three feet: becauſe at that diſtance the ſecond ſurface reflected the rays by its concavity directly towards the paſteboard.

(43.) Theſe two experiments demonſtrate the uſe of the ſecond ſurface of the mirror, and ſhow the manner of placing it to moſt advantage. Thoſe that follow ſhow the uſe of the firſt ſurface with reſpect to theſe rings; and he was led to make them by the caſual obſervation above mentioned. Newton had remarked, that when he made uſe of a mirror of the ſame focus with the firſt he had uſed, but of twice the thickneſs, he found the diameter of the rings much ſmaller than before. This obſervation the duke thought favourable to his own concluſions; for if theſe rings depend upon the firſt ſurface, the nearer it is to the ſecond, which only reflects the ray tranſmitted from it, the larger they ought to appear upon the paſteboard.

(44.) To aſcertain this fact, he thought of making uſe of two moveable ſurfaces; and to make uſe of a micrometer to meaſure the diſtance between them with exactneſs. For this purpoſe he took a metallic mirror belonging to a reflecting teleſcope, (being part of a ſphere of ten feet radius,) and fixed it firm upon a foot in which was a groove that carried a light frame, to which was faſtened a thin piece of talc tarniſhed with milk and water. The frame that ſupported the piece of talc could either be brought into contact with the mirror, or be removed 8 or 9 inches from it, and the micrometer ſhowed to the utmoſt exactneſs the leaſt motion of the frame.

(45.) Having placed this mirror ten feet from the paſteboard, that is, at the diſtance of the radius of its own ſphere, he obſerved the rings to appear very diſtinct: the form of his mirror being very true: but the diameter of the rings upon the paſteboard varied with the diſtance of the talc from the mirror; ſo that they were very large when the talc was near the mirror, and very ſmall when it was placed 7 or 8 inches from it.

(46.) Theſe experiments proved, that the rings were formed by the firſt ſurface, and reflected by the ſecond; but it ſtill remained to be determined in what manner they were formed. He imagined that the ſmall pencils of rays that were tranſmitted through the pores of the glaſs, or any other tranſparent ſubſtance, might ſuffer a kind of inflection, which might change the cylinder which they formed into a truncated cone, either by means of their different degrees of inflexibility or by the different diſtances at which they paſs by the edges of the ſmall hole through which they are tranſmitted.

(47.) Purſuing this idea, he thought of making uſe of ſome body, the pores of which were of a known and determined ſhape. Inſtead, therefore, of the piece of talc, he placed a piece of fine linen in the above mentioned frame, ſtretching it as even as poſſible, to make the pores formed by the threads more exact and more permeable by the light; and he ſoon found, with great pleaſure, that this conjecture was verified: for, inſtead of the circular rings which he had before, they were now manifeſtly ſquare, though their angles were a little rounded; and they were coloured as the others, though the light was not very vivid, on account of the quantity that was ſtopped by the muſlin. When, inſtead of the muſlin, he ſtretched acroſs his frame fine ſilver wires exactly parallel, at the diſtance of about ¾ of a line, or a whole line from one another, without any other wires acroſs them; inſtead of the rings which he had ſeen before, there was nothing upon the paſteboard but a gleam of white light divided by many ſmall ſtreaks, coloured in a very vivid manner, and in the ſame manner as the rings.

(48.) Thus we have another hypotheſis of the formation of colours, namely, by the inflection of light in its paſſage out from between the ſolid and impenetrable particles of which bodies are compoſed. It is, however, very difficult, upon the hypotheſis either of Sir Iſaac Newton, or that of the Duke de Chaulnes, to give a reaſon why bodies that are not entirely white, ſhould not appear variouſly coloured. For, it appears from Sir Iſaac Newton's experiments, that plates of different denſity are capable of exhibiting the ſame colours; and that where a plate is continually varying in denſity, it will produce all the colours. Now it is evident, that the plates, of which we ſuppoſe all natural bodies to be compoſed, muſt be ſimilar to one that is perpetually varying in its thickneſs: for ſuppoſing the plates of which any ſubſtance is compoſed to be of any determinate thickneſs, 9 millionth parts of an inch for inſtance; ſuch of the rays as are reflected from this plate will be red. But if any of them penetrate to the depth of 11 ſixteenths of theſe parts, they will be reflected of a violet colour, *&c.* and thus muſt alloy and obſcure the red; and ſo of others. If we ſuppoſe the colours to be produced by inflection, it will be equally difficult to account for ſome particular rays being inflected and others not; ſeeing we obſerve that all of them are capable of being inflected by every ſubſtance whatever, when they paſs very near it. In ſome caſes too, colours are produced when the light is neither refracted nor inflected, as far as we can judge; and this ſeems to obſcure the theory of chromatics more than any thing we have yet mentioned.

SECT. VI. *Of the* PERMANENT COLOURS *of* OPAQUE BODIES.

(49.) Mr DELAVAL, beſides the experiments already related (§ 21, 22) has communicated to the Literary and Philoſophical Society of Mancheſter, a paper *upon the Permanent Colours of Opaque Subſtances.*

(50.) He obſerves, that the arts of colour-making and dyeing were, in very remote ages, carried to the height of perfection, in Phœnicia, Egypt, Paleſtine, I[illegible]a, &c. The inhabitants of thoſe countries excelled alſo in the art of imitating gems, and tinging glaſs and enamel of various colours. The colours uſed in very ancient paintings, were as various as thoſe now in uſe, and greatly ſuperior both in beauty and durability. The paints uſed by Apelles were ſo bright, that he was obliged to glaze his pictures with a dark coloured varniſh, leſt the eye ſhould be offended by their brightneſs: and even theſe were inferior to what had been uſed among the ancient Egyptians.

(51.) The changes of colour in permanently coloured bodies, are produced by the ſame laws, which take place in tranſparent colourleſs ſubſtances; and the experiments by which they can be inveſtigated, conſiſt of various methods of uniting the colouring particles into larger, or dividing them into ſmaller maſſes.

(52.) The great Newton made his experiments chiefly on tranſparent ſubſtances; and in the few places where he treats of others, acknowledges his deficiency of experiments. He makes the following remark on thoſe bodies which reflect one kind of light, and tranſmit another; viz. "that if theſe glaſſes or liquors were ſo thick and maſſy, that no light could get through them, he queſtions whether they would not, like other opake bodies, appear of one and the ſame colour, in all poſitions of the eye, though he could not yet affirm it from experience."

(53.) It was an opinion of this great philoſopher, that all coloured matter reflects the rays of light; ſome reflecting copiouſly the more, others the leſs refrangible rays. He was likewiſe of opinion, that opake bodies reflect the light from their anterior ſurface, by ſome power of the body, evenly diffuſed over, and external to it. With reſpect to tranſparent coloured liquors, he ſays, that a tranſparent body, which looks of any colour by tranſmitted light, may alſo look of the ſame colour by reflected light, the light of that colour being reflected by the farther ſurface of that body, or by the air beyond it; and then the reflected colour will be diminiſhed, and perhaps ceaſe, by making the body very thick, and pitching it on the back ſide, to diminiſh the reflections of its farther ſurface, ſo that the light reflected from the tinging particles may predominate. In ſuch caſe the reflected light will be apt to vary from that which was tranſmitted.

(54.) To inveſtigate the truth of theſe opinions, Mr Delaval entered upon a courſe of experiments with tranſparent coloured liquors and glaſſes, as well as with opake and ſemi-tranſparent ſubſtances. From theſe he found, that in tranſparent coloured ſubſtances, the colouring matter *does not reflect any light;* and when, by intercepting the light which was tranſmitted, it is hindered from paſſing thro' ſuch ſubſtances, they do not vary from their former colour to any other, *but become entirely black.*

(55.) This incapacity of the colouring particles of tranſparent bodies to reflect light, being deduced from very numerous experiments, it may be conſidered as a general law. It appears the more extenſive, if we conſider, that for the moſt part, the tinging particles of tranſparent ſubſtances are extracted from opake bodies; that the opake bodies owe their colours to theſe particles, as well as the tranſparent; and that by the loſs of them they are deprived of their colours.

(56.) Mr Delaval, for his experiments, uſed ſmall phials of flint glaſs, whoſe form was that of a parallelopiped; the height, excluſive of the neck, about 2 inches; the baſe about an inch ſquare, the neck 2 inches long. The bottom and 3 ſides of each of theſe phials were covered with a black varniſh; the cylindrical neck, and the anterior ſide, except at the edges, being left uncovered. He was careful to avoid any crevices in the varniſh, that no light might be admitted, except through the neck or anterior ſide of the phials. In making ſimilar experiments, the phials ſhould be perfectly clean, and thoſe liquors that depoſit a ſediment ſhould not be put into them, but at the time which the experiments, are to be made. The uncovered ſide likewiſe ſhould not be placed oppoſite to the window where the light is admitted, becauſe in that ſituation the light would be reflected from the fartheſt ſide of the phial: ſmooth black ſubſtances, reflecting light powerfully, are beſt ſituated when the uncovered ſide forms a right, angle with the window.

(57.) All theſe precautions being taken, he viewed a great number of ſolutions, both of coloured metallic ſalts, and of the tinging matter of vegetables, obſerving that the colour by reflection was blach, *whatever it might be* when viewed by tranſmitted light. If theſe colours are, however, ſpread thin upon a white ground, they appear of the ſame colour as when viewed by tranſmitted light; but on a black ground they afford no colour, unleſs the black body be poliſhed, in which caſe the reflection of light through it produces the ſame effect as tranſmiſſion.

(58.) The experiments made with coloured glaſſes were, in many reſpects, analogous to thoſe with tranſparent coloured liquors. For theſe he made ſeveral parcels of colourleſs glaſs, compoſed of borax and white ſand. The glaſs was reduced to powder, and afterwards ground together with the ingredients, by which the colour was to be imparted; a method he found preferable to the uſual mode of tinging glaſſes, as they became little inferior in luſtre to real gems.

(59.) The reſult of all his experiments was, that when matter is of ſuch thinneſs, and the tinge ſo diluted, that light can be tranſmitted through it, the glaſſes then appear vividly coloured; and when they are in large maſſes, and the tinging matter is more denſely diffuſed through them, they appear black; for theſe, as well as the tranſparent liquors, ſhew their colour only by tranſmiſſion. Having in this manner formed pieces of ſuch glaſs, two inches thick, he incloſed them in black cloth on all ſides, except their anterior and farther ſurfaces. In this ſituation each of them ſhewed a vivid colour when light was tranſmitted through them; but when the poſterior ſurface was likewiſe covered with the cloth to prevent the tranſmiſſion, no other colour but black was exhibited.

(60.) From theſe phenomena he drew the following inferences: 1. "That the colouring particles do not reflect any light. 2. That a medium, ſuch as is deſcribed by Sir Iſaac Newton, is diffuſed over both the anterior and poſterior ſurfaces of the plates, whereby objects are equally and regularly reflected as by a mirror."

(61.) Mr Delaval next conſiders the colouring particles themſelves, pure and unmixed with other media. To procure maſſes made up of ſuch particles, ſeveral tranſparent coloured liquors were reduced to a ſolid conſiſtence by evaporation; by employing a gentle heat the colouring matter will not be injured, and may have its particles again ſeparated by water or other fluids, and tinging them as before. In this ſtate alſo the colouring particles reflect no light, and therefore appear uniformly black, whatever be the ſubſtance from which they may have been extracted. He endeavours to prove by experiments on the colouring particles of opake bodies, that theſe colours are produced on the above-mentioned principles; that they ſeem black when very denſe, but ſhew their proper tinge when ſpread thin upon a white ground. The green of graſs and leaves of plants being obtained by digeſting them in rectified ſpirits of wine, and placed in one of the above-mentioned phials, the part of the neck tranſmitted the vivid green, but that contiguous to the uncovered ſide of the phial was black.

(62.) After the colour had been totally extracted, the leaves remained apparently unaltered as to figure or texture, but were entirely white, or of a white tinged with brown. Red, blue, and purple flowers were alſo digeſted with ſpirits of wine, all of which yielded their colouring matter to the ſpirit, and became white when deprived of it. From moſt of theſe flowers the ſpirit, however, either acquired no tinge at all, or only a very faint one; but when acidulated it became red, and by the addition of an alkali became blue, purple, or green, according to the quantity of the alkali, and the nature of the infuſion. In theſe ſtates all of them, when viewed by tranſmitted light, or poured upon a white paper, ſhewed their colours, but univerſally appeared black by reflection. Other experiments were tried with other flowers, but the final reſult was the ſame, *no colour by reflection*.

(63.) Cotton, linen, white paper, &c. may be tinged of any of theſe colours, by dipping them in the infuſions; and the conſideration of the manner in which the colours are imparted to linen, affords much inſight into the manner in which natural colours are produced. The colouring matter of plants being extracted, the ſolid fibrous parts, thus diveſted of their covering, diſplay their natural *whiteneſs*. White linen, paper, &c. are formed of ſuch fibrous vegetable matter, which is bleached by diſſolving and detaching the heterogeneous colouring particles: when theſe therefore are dyed or painted with vegetable colours, it is evident that they do not differ in their manner of acting on the rays of light from natural vegetable bodies: both yield their colours by tranſmitting through the tranſparent coloured matter the light which is reflected from the white ground.

(64.) This *white matter* always exiſts without any conſiderable mixture in plants, while they are in a ſtate of vegetation, as cotton, white flowers, the pitch, wood, ſeeds, roots, and other parts of ſeveral kinds of vegetables. When decayed leaves of trees have been long expoſed to the atmoſphere, their coloured juices are ſometimes ſo perfectly extracted, that their fibres appear white. Mr Delaval has rendered aſhes *intenſely white*, by carefully calcining them, and afterwards grinding with a ſmall proportion of nitre, and expoſing them to ſuch a degree of heat as would cauſe the nitre to deflagrate with the remaining quantity of phlogiſton. The aſhes were digeſted with the marine acid, in order to diſſolve the ferruginous matter diffuſed them, and the remainder repeatedly waſhed in water.

(65.) Hence it would appear, that the earth which forms the ſubſtance of plants is white, and ſeparable from that ſubſtance which gives to each its peculiar colour; that whenever it is pure and unmixed, or diffuſed through colourleſs media, it ſhews its native whiteneſs, and is the only vegetable matter endowed with a native whiteneſs. This white matter may be diſcovered by other means beſides burning; thus roſes may be whitened by expoſing them to burning ſulphur, and the colour may be again reſtored by the addition of an acid either mineral or vegetable. Thus it appears that the colouring matter of the flowers is not diſcharged or removed, but only diſſolved by the phlogiſton, and thereby divided into particles too minute to exhibit any colour. In this ſtate, together with the vegetable juice in which they are diffuſed, they form a colourleſs tranſparent covering, through which the white matter of the flowers is ſeen untinged. The colouring matter of plants conſiſts, according to Mr Delaval principally of inflammable matter, and their ſolubility in and union with phlogiſton.

(66.) The colour of *dyed ſubſtances* is deſtroyed by the rays of the ſun. Thus dyed ſilk, and other ſubſtances of that kind, when expoſed to the ſun's light, are deprived of their colour in every part on which the rays are allowed to act; whilſt thoſe preſerve their colours which are defended from the light. The colours, thus *impaired*, may be reſtored, if acids are employed while the injury is recent.

(67.) The whole of Mr Delaval's experiments ſhew, that the colouring matter of plants does not exhibit any colour by reflection, but by tranſmiſſion only; that their ſolid earthy ſubſtance is a white matter, and that it is this part that has the property of reflection; that the colours of vegetables are produced by the light reflected from this white, and tranſmitted from thence through the coloured coat or covering which is formed on its ſurface by the colouring particles; that whenever the colouring matter is either diſcharged or divided by ſolution into particles too minute to exhibit any colour, the ſolid ſubſtance itſelf diſplays that whiteneſs which is its diſtinguiſhing characteriſtic.

(68.) He next proceeded to examine the coloured parts of animal ſubſtances, and found them exactly ſimilar with regard to the manner in which the colour is produced to the vegetable ſubſtances. The tinctures and infuſions of cochineal and kermes exhibit their colours when light is tranſmitted through them, but ſhew none by reflection. On diluting freſh ox gall with water, and examining it in the phials, the part viewed by tranſmitted light was yellow, but the anterior ſurface in the lower part of the phial was black, and reflected no colour. Fleſh derives its colour entirely from the blood. When deprived of it the fibres and veſſels are perfectly white; as well as the membranes, tendons, and bones when freed from their aqueous and volatile parts.

(69.) The florid red colour of the ſhells of lobſters after boiling, is no more than a mere ſuperficial covering ſpread over the calcareous earth of which the ſhells are compoſed, and may be removed from the ſurface by ſcraping or filing. Before the application of heat this ſuperficial covering is much denſer, inſomuch that in ſome parts of the ſhell it appears quite black, being too thick to admit the paſſage of the light to the ſhell and back again; but where this tranſparent blue colour of the unboiled lobſter is thinner, it conſtantly appears like a blue film. In like manner the colours of the eggs of certain birds are entirely ſuperficial, and may be ſcraped off, leaving the white calcareous earth expoſed.

(70.) Feathers alſo owe their colours entirely to a very thin layer of ſome tranſparent matter upon a white ground. This was aſcertained by ſcraping off the ſuperficial colours from certain feathers, which were ſtrong enough to bear the operation, and which ſeparated the coloured layers from the white ground on which they had been naturally ſpread. The lateral fibres cannot have their colours ſeparated in this manner; but their texture, when viewed by a microſcope, ſeems to indicate that their colours are produced on them by the ſame means. In a word, he found that in all the animal ſubjects he examined, the colours were produced by the tranſmiſſion of light from a white ground through a tranſparent coloured medium.

(71.) The mineral kingdom abounds with coloured ſubſtances, belonging principally to two claſſes, earths and metals. The former, when pure, are all white, and their colour ariſes from phlogiſtic or metallic mixtures. Calcareous earths, when indurated, conſtitute marble, and may be tinged with various colours by means of metallic ſolutions, all which are ſimilar in their nature to the dyes put upon ſilk, cotton, or linen, and invariably proceed from the ſame cauſe, the tranſmiſſion of light through a very tranſparent medium. Flints are formed from ſiliceous earths, and owe their colour to the ſtate of fire within them; when ſufficiently heated, they are rendered white by the loſs of the inflammable matter which produced their colour; when impregnated with metals, they form agates, cornelians, jaſpers, and various other coloured cryſtals. The coloured gems alſo receive their different hues from metals, and may be imitated by glaſſes tinged with ſuch inflammable or metallic matter as entered into the original ſubſtances, all exhibiting their various tints in the ſame manner, by the tranſmiſſion of light from a reflected white ground.

(72.) Even the colours of metals, Mr Delaval obſerves, are produced in the ſame manner. Gold exhibits a white light tinged with yellow; this is grounded on an experiment of Sir I. Newton, who ſays, that gold in a white light appears of the ſame colour as in the day-light, but that on intercepting a due quantity of yellow-making rays, it will appear like ſilver, which ſhews that its yellowneſs ariſes from an exceſs of the intercepted rays tinging that whiteneſs with their colour when they are let paſs through. A ſolution of ſilver is pellucid and colourleſs; a ſolution of gold tranſmits yellow, but reflects no colour. This metal, when united to glaſs, yields no reflection, but only by tranſmiſſion.

(73.) All theſe circumſtances ſeem to indicate, that the yellow colour of gold ariſes from a yellow tranſparent matter, which is a conſtituent part of that metal, and that is equally mixed with the white particles of the gold, and tranſmits the light reflected by them; in like manner as when ſilver is gilt, or foils are made by covering white metals with tranſparent colours. But theſe factitious coverings are only ſuperficial, whereas the yellow matter of gold is diffuſed throughout the whole ſubſtance of the metal, and appears to envelope and cover each of the white particles; the yellow matter bears to the white about the ſame proportion that the yellow-making rays, which were intercepted, bear to all the other rays compriſed in the white light of the ſun.

(74.) Sir I. Newton has ſhewn that when the interſtices of bodies are repleniſhed with media of different denſities, the bodies are opake; that thoſe ſuperficies of tranſparent bodies reflect the greateſt quantity of light, which intercede media that differ moſt in their refractive denſities; and that the reflections of thin tranſparent ſubſtances are conſiderably ſtronger than thoſe made by the ſame ſubſtance of a greater thickneſs. Hence the minute portion of air, or of the rarer medium, which occupies the pores or interſtices of denſe bodies, is a minute white ſubſtance.

(75.) This is manifeſt in the whiteneſs of froth, and of pellucid colourleſs ſubſtances, ſuch as glaſs, cryſtal, or ſalts reduced to powder, or otherwiſe flawed; for in all theſe inſtances a white light is reflected from the air or rarer medium, which intercede the particles of the denſer ſubſtance, whoſe interſtices they poſſeſs. Hence alſo we ſee why white opake ſubſtances are rendered pellucid by being reduced to uniform maſſes, whoſe component parts are every where nearly of the ſame denſity; for as all pellucid ſubſtances are rendered opake and white by the admixture of pellucid colourleſs media, and conſiderably different denſities, they are again deprived of their opacity, by extracting theſe media, which keep their particles at a diſtance from each other: thus froth and ſnow, when reſolved into water, loſe their whiteneſs, and aſſume their former pellucid appearance. In like manner the opake white earths are by proper fluxes reduced to a pellucid colourleſs glaſs; becauſe all reflections are made at the ſurfaces of bodies differing in denſity from the ambient medium, and in the confines of equally denſe media there is no reflection.

(76.) As the calces of metals are capable of reflecting their colours by the intervention of air, ſo, when mixed with oil in making paints, they always aſſume a darker colour, becauſe the exceſs of the denſity of oil over air forms a ſenſible difference, when comparatively conſidered with reſpect to the ſpecific gravity of the rarer metals. From this cauſe perceptibly leſs light is reflected from the moleculæ of oil than thoſe of air, and conſequently the maſs appears darker. The caſe is however different with ſuch paints as are formed of the denſer metals, as vermilion, minium, &c. for though it differs very conſiderably from air in its ſpecific denſity, yet it alſo differs very much in this reſpect from the denſer metallic powders; and the moleculæ of oil, which divide their particles, act upon the light ſo ſtrongly, that the reflection of light occaſioned by them cannot be diſtinguiſhed from thoſe which are cauſed by rarer media. Hence, when we mix vermilion or minium with oil, the colour is not ſenſibly changed

(77.) All thoſe earths, which in their natural ſtate are of pure white, conſtitute tranſparent colourleſs media, when vitrified with proper fluxes, or when diſſolved in colourleſs menſtrua; and the ſaline maſſes, obtainable from their ſolution, are tranſparent and colourleſs, while they retain the water which is neceſſary to their cryſtallization, and are not flawed or reduced to powder: but after their pores and interſtices are opened in ſuch a manner as to admit of air, they become white and opake by the admittance of the rare medium. The earthy particles, which form the ſolid parts of bodies, generally exceed each other in denſity; conſequently theſe particles, when contiguous to the rare media already mentioned, muſt reflect the rays of light with a force proportionate to their denſity.

(78.) The reflective power of bodies does not depend merely upon their exceſs of denſity, but upon their difference of denſity with reſpect to the ſurrounding media. Tranſparent colourleſs particles, whoſe denſity is greatly inferior to that of the media they come between, alſo powerfully reflect all ſorts of rays, and thereby become white; of this kind are the air, or other rare fluids, which occupy the interſtices of liquors, and in general of all denſer media, where ſuch rare particles find acceſs. Hence we may conclude, that white opake bodies are conſtituted by the union or contiguity of two or more tranſparent colourleſs media, differing conſiderably from each other in their reſpective powers.

(79.) Of theſe ſubſtances we have examples in frothy emulſions, or other imperfect combinations of pellucid liquors, as milk, ſnow, calcined or pulveriſed ſalts, glaſs or cryſtal reduced to powder, white earths, paper, linen, and even thoſe metals which are called white by mineralogiſts; for thoſe metals do not appear white unleſs their ſurfaces be rough; as in that caſe only theſe are interſtices on their ſurface ſufficient to admit the air, and thus make a reflection of a white and vivid light.

(80.) The poliſhed ſurfaces of metallic mirrors reflect the incident rays equally and regularly according to their ſeveral angles of incidence, ſo that the reflected rays do not interfere with each other, but remain ſeparate and unmixed, and therefore diſtinctly exhibit their ſeveral colours. Hence it is evident, that white ſurfaces cannot act upon the light as mirrors, becauſe all the rays which are reflected from them are blended in a diſorderly and promiſcuous manner.

(81.) The phenomena above mentioned give us ſome inſight into the nature and cauſe of Opacity, as they clearly ſhew, that even the rareſt tranſparent colourleſs ſubſtances, when their ſurfaces are adjacent to media differing greatly from them in refractive power, thereby acquire a perfect opacity, and may aſſume a hue and reſplendence ſimilar to that of white metals; and that the rarer pellucid ſubſtances cannot by the light be diſtinguiſhed from the denſe opake metals; and this ſimilarity to the ſurface of metals not only occurs, when from the roughneſs of their ſurfaces they reſemble poliſhed metals in whiteneſs, but alſo when from their ſmoothneſs they reſemble the poliſhed ſurface of metals.

(82.) Metals ſeem to conſiſt entirely of tranſparent matter, and to derive their apparent opacity and luſtre ſolely from the copious reflection of light from their ſurfaces. The analogy between metals and tranſparent media, as far as concerns their optical properties, will appear plain from the following conſiderations: 1. All metals diſſolved in their proper menſtrua are tranſparent. 2. By the union of two or more tranſparent media, ſubſtances are conſtituted which are ſimilar to metals in their opacity and luſtre, as plumbago and marcaſites. 3. The tranſparent ſubſtances of metals, as well as thoſe of minerals, by their union with inflammable matter, acquire the ſtrong reflective powers from which their luſtre and opacity ariſe. 4. The ſurfaces of pellucid media, ſuch as glaſs or water, aſſume a metallic appearance, when by their ſmoothneſs, difference of denſity with reſpect to the contiguous media, or any other, they are diſpoſed copiouſly to reflect the light.

(83.) From theſe conſiderations, it is plain that opake ſubſtances are conſtituted by the union or contiguity of tranſparent colourleſs media, differing from one another in their reflective powers; and that when the common ſurface, which comes between ſuch media, is plane, equal, and ſmooth, it reflects the incident rays equally and regularly as a mirror; but when their ſurface is rough and unequal, or divided into minute particles, it reflects the incident rays irregularly and promiſcuouſly in different directions, and conſequently appears white. When the interſticial vacuities of bodies are ſo diſpoſed, that the light can preſerve its rectilinear courſe through them, ſuch bodies appear luminous throughout, and are viſible in their internal ſubſtance; but when their conſtitution is ſuch as will not allow a free paſſage to the light, they are then viſible only by thoſe rays which are reflected from their ſurface, and their internal ſurface is cold and dark.

(84.) It alſo appears from various conſiderations, that the chemical properties of bodies have a conſiderable influence on their colour; for, doubtleſs, a force which acts powerfully in refracting the rays, muſt likewiſe influence their reflection: and it is hardly to be doubted, but that the action of fire has a conſiderable ſhare in the production of colours; indeed its ſhare in the operations of nature is ſo conſiderable, that it would be ſtrange if it ſhould be excluded from this part.

(85.) Sir I. Newton found, on comparing the refractive power of different bodies, that inflammable ſubſtances poſſeſs it in a much greater degree than ſuch as are not inflammable. From his obſervations on this ſubject, he drew the wonderful concluſion, that the *diamond* contained a large quantity of *inflammable* matter; that *water* was an intermediate ſubſtance between inflammable and uninflammable bodies, and that it ſupplied vegetables with the inflammable principle; truths which have been demonſtrated only in our own time.

(86.) Subſtances that are not tranſparent in their ordinary ſtate, may be rendered ſo either by relaxing their parts with heat, ſo that light may paſs through them more eaſily, or by giving ſome new direction, together with an additional force, to the matter of light. Mr. Hawkſbee was very much ſurpriſed to find, that the ſealing wax, and the pitch, within ſide a glaſs globe, became ſo tranſparent when the glaſs was whirled about and rubbed with the hand, that the fingers might be plainly ſeen on the other ſide through the coating. Oil is condenſed, when cold, into a ſort of globules impervious to the light; but when theſe globules are diſſolved, and opened by the action of fire, the oil not only becomes tranſparent, but appears as bright and ſhining as if the light were a natural part of its compoſition. Many heterogeneous fluids grow dark and muddy with cold, but they may be ſoon clarified again by the application of a moderate heat: red port wine is ſometimes as foul as if brick-duſt was mixed with it, but will ſoon become bright and clear by the application of warmth.

Sect. VII. Summary view *of the* Newtonian Theory *of* Colours.

(87.) From the whole of the preceding experiments we can only conclude, that the theory of colours ſeems not yet to be determined with certainty; and very formidable, perhaps unanſwerable, objections, might be brought againſt every hypotheſis on this ſubject that hath been invented. The diſcoveries of Sir Iſaac Newton, however, are ſufficient to juſtify the following

(88.) Aphorisms.

1. All the colours in nature proceed from the rays of light.

2. There are ſeven primary colours: which are red, orange, yellow, green, blue, indigo, and violet.

3. Every ray of light may be ſeparated into the ſeven primary colours.

4. The rays of light in paſſing through the ſame medium have different degrees of refrangibility.

5. The difference in the colours of light ariſes from its different refrangibility: that which is the leaſt refrangible producing red; and that which is the moſt refrangible violet.

6. By compounding any two of the primary colours, as red and yellow, or yellow and blue, the intermediate colour, as orange or green, may be produced.

7. The colours of bodies ariſe from their diſpoſitions to reflect one ſort of rays, and to abſorb the other: thoſe that reflect the leaſt refrangible rays appearing red; and thoſe that reflect the moſt refrangible, violet.

8. Such bodies as reflect two or more ſorts of rays appear of various colours.

9. The whiteneſs of bodies ariſes from their diſpoſition to reflect all the rays of light promiſcuouſly.

10. The blackneſs of bodies proceeds from their incapacity to reflect any of the rays of light; and from hence it ariſes, that black bodies, when expoſed to the ſun, become ſooner heated than all others.

(89.) We cannot conclude this part of our ſubject, without taking notice of a very falſe and even *unphiloſophical* inference, that has been deduced from the Newtonian theory of colours, by M. Voltaire and ſome other infidel writers, as a foundation, by analogy, for other inferences of a more miſchievous tendency. Theſe philoſophers have aſſerted, that light and colour, as apprehended by the imagination, are only *ideas* in the mind, and not *qualities*, that have any real exiſtence in matter.

(90.) By colours all men, who have not been miſled by this ſophiſtry, underſtand not a ſenſation of the mind, which can have no exiſtence when it is not perceived, but a quality or modification of bodies, which continues the ſame whether it be ſeen or concealed. The ſcarlet roſe is not leſs a ſcarlet roſe when we ſhut our eyes, and was ſo at midnight when no eye ſaw it. The colour ſurely remains when the appearance ceaſes; and it remains the ſame even when the appearance changes; for when we view the ſcarlet roſe through a pair of green ſpectacles, the appearance is changed; but we do not conceive the colour in the roſe to be changed. To a perſon in a jaundice it has ſtill another appearance, but he is eaſily convinced the change is in his eye, and not in the colour of the object. We can, by a variety of optical experiments, change the appearance of figure and magnitude in a body, as well as that of colour; we can make one body appear to be ten. But no man believes the multiplying glaſs really produces ten guineas out of one; in like manner, no one believes the coloured glaſs changes the real colour of the object ſeen through it, when it alters the appearance of that colour.

(91.) Colour, therefore, is not a ſenſation, but a ſecondary quality of bodies, whereby in daylight they exhibit a certain and well underſtood appearance; and there is a real permanent quality in bodies, to which the common uſe of this word agrees. Had modern philoſophers given, as they ought to have done, the name of colour to the *cauſe* inſtead of to the *effect*, they would not have ſet philoſophy apparently in contradiction with common ſenſe; for they muſt have then affirmed with the vulgar, that colour is a property of bodies. and that there is nothing like it in the mind. Their language, as well as their ſentiments, would have been perfectly agreeable to the common apprehenſions of mankind, and true philoſophy would have joined hands with common ſenſe.

Sect. VIII. Entertaining Experiments *founded on the* Preceding Principles.

I. *Out of a* SINGLE COLOURLESS RAY *of* LIGHT *to produce* SEVEN OTHER RAYS, *which ſhall paint on a* WHITE BODY, *the* SEVEN PRIMARY COLOURS *of* NATURE.

(92.) Procure of an optician a large glaſs priſm, *Plate* LXXIV, *fig.* 1. DEF, well poliſhed, two of whoſe ſides muſt contain an angle of about 64 degrees Make a room quite dark, and in the window ſhutter AB, cut a round hole, about one 3d of an inch in diameter, at C, through which a ray of light LI paſſing, falls on the priſm DEF: by that it is refracted out of the direction IT, in which it would have proceeded into another GH; and, falling on the paper MNSX, will there form an oblong ſpectrum PQ, whoſe ends will be ſemicircular, and its ſides ſtraight; and if the diſtance of the priſm from the paper be about 18 feet, it will be 10 inches long, and 2 inches wide. This ſpectrum will exhibit all primary colours: the rays between P and V, which are the moſt refracted, will paint a deep violet; thoſe between V and I, indigo; thoſe between I and B, blue; thoſe between B and G, green; thoſe between G and Y, yellow; thoſe between Y and O, orange; and thoſe between O and R, being the leaſt refracted, an intenſe red. The colours between theſe ſpaces will not be every where equally intenſe, but will incline to the neighbouring colour: thus the part of the orange next to R, will incline to a red; that next to Y, to a yellow: and ſo of the reſt.

II. *From* TWO *or* MORE *of the* PRIMARY COLOURS, *to compoſe* OTHERS *that ſhall, in appearance, reſemble thoſe of the* FORMER.

(93.) By mixing the two homogeneal colours red and yellow, an orange will be produced, ſimilar in appearance to that in the ſeries of primary colours; but the light of the one being homogeneal, and that of the other heterogeneal, if the former be viewed through a priſm it will remain unaltered, but the other will be reſolved into its component colours red and yellow. In like manner other contiguous homogeneal colours may compound new colours; as by mixing yellow and green, a colour between them is formed; and if blue be added, there will appear a green that is the middle colour of thoſe three. For the yellow and blue, if they are equal in quantity, will draw the intermediate green equally toward them, and keep it as it were, in equilibrio, that it verge not more to the one than to the other. To this compound green there may be added ſome red and violet; and yet the green will not immediately ceaſe, but grow leſs vivid; till by adding more red and violet it will become more diluted; and at laſt, by the prevalence of the added colours, it will be overcome, and turned into ſome anomalous colour. If the white of the ſun, compoſed of all kinds of rays, be added to any homogeneal colour, that colour will not vaniſh, nor change its ſpecies, but be diluted; and by adding more white, it will become continually more diluted. Laſtly, if red and violet be mixed, there will be generated, according to their various proportions, various purples, ſuch as are not like, in appearance, to the colour of any homogeneal light; and of theſe purples, mixed with blue and yellow, other new colours may be compoſed.

III. *Out of* THREE *of the* PRIMARY COLOURS, RED, YELLOW, *and* BLUE, *to produce* ALL *the other* PRISMATIC COLOURS, *and all that are* INTERMEDIATE *to them.*

(94.) Provide 3 panes of glaſs of about 5 inches ſquare; *Fig.* 2, and divide each of them, by parallel lines, into five equal parts. Take 3 ſheets of very thin paper; and paint them lightly, one blue, another yellow, and the third red. Water colours muſt be uſed for this purpoſe: the blue may be that of Pruſſia, and very bright; the red, carmine; and the yellow, gambooge, mixed with a little ſaffron. Theſe colours muſt be laid very light and even, on both ſides of the paper. Then paſte on one of the glaſſes 5 pieces of the red paper; one of which muſt cover the whole glaſs, the 2d only the four lower diviſions, the 3d the three lower, the 4th the two loweſt, and the 5th the laſt diviſion only. On the other two glaſſes five pieces of the blue and yellow papers muſt be paſted in like manner. Procure a box of about ſix inches long, and the ſame depth and width as the glaſſes; it muſt be black on the inſide: let one end be quite open, and in the oppoſite end there muſt be a hole large enough to ſee the glaſſes completely. It muſt alſo open at the top, that the glaſſes may be placed in it conveniently.

(95.) When any one of theſe glaſſes is put in the box, and the open end is turned toward the ſun, five diſtinct ſhades of the colour it contains will be ſeen. If the blue and yellow glaſſes are placed together, in a ſimilar direction, five ſhades of green will appear diſtinctly formed. When the blue and red glaſſes are placed, a bright violet will be produced; and by the red and yellow, the ſeveral ſhades of orange.

(96.) If inſtead of placing theſe glaſſes in a ſimilar poſition, the ſide AB of the yellow glaſs is placed againſt the ſide BD of the blue, *Fig.* 3. all the various greens that are produced by nature will be ſeen; if the blue and red glaſſes be placed in that manner, all the poſſible varieties of purples, violets, &c. will appear; and, if the red and orange glaſſes be ſo placed, there will be all the intermediate colours, as the marygold, aurora, &c. In the firſt poſition of the glaſſes, the quantity of blue and yellow being equal, the ſame ſort of green is conſtantly viſible: but by thus inverting the glaſſes, the quantity of the colours being conſtantly unequal, a very pleaſing variety of tints is produced.

IV. *To produce all the gradations of the priſmatic colours, by means of the three primary colours, red, yellow, and blue, together with light and ſhade.*

(97.) On 7 ſquare panes of glaſs, paſte papers that are painted with the 7 priſmatic colours, in the ſame manner as in the laſt experiment. The colours for the orange, green, indigo, and violet, may be made by mixing the other three. Then with biſtre made of ſoot, well diluted, ſhade a ſheet of very thin paper, by laying it light on both its ſides. With pieces of this paper cover four 5ths of a glaſs, of the ſame ſize with the others, by laying one piece on the four loweſt diviſions, another on the three loweſt diviſions, a 3d on the two loweſt, and the 4th on the loweſt diviſion only; leaving the top diviſion quite uncovered. When one of the coloured glaſſes is placed in the box, together with the glaſs of ſhades, ſo that the ſide AB of the one be applied to the ſide BC of the other, as in *fig.* 3. the ſeveral gradations of colours will appear ſhaded in the ſame manner as a drapery judiciouſly painted with that colour.

(98.) On this principle, certain French artiſts have endeavoured to imitate, by deſigns printed in colours, paintings in oil; which they do by 4 plates of the ſame ſize, on each of which is engraved the ſame deſign. One of theſe contains all the ſhades that are to be repreſented, and which are painted either black or with a dark grey. One of the 3 other plates is coloured with blue, another with red, and the 3d with yellow; each of them being engraved in thoſe parts only which are to repreſent that colour; and the engraving is either ſtronger or weaker, in proportion to the tone of colour that is to be repreſented.

(99.) When a red drapery is required, it is engraved on the plate aſſigned to that colour; and ſo of yellow and blue: but if one of the other colours be wanting, ſuppoſe violet, it muſt be engraved on thoſe that print the reſt and blue: and ſo of the reſt. The plates of this kind have been hitherto engraved in the manner of mezzotinto; but theſe, unleſs they are ſkilfully managed, ſoon become ſmutty. Engravings in the manner of the crayon will perhaps anſwer better. The principal difficulty in this ſort of engraving ariſes from a want of a ſkilful management, in giving each plate that preciſe degree of engraving which will produce the tone of colour required. If a bright green is to be repreſented, there ſhould be an equal quantity of graving on the red and yellow plates: but if an olive green, the yellow plate ſhould be engraved much deeper than the red.

(100.) Theſe four plates are then paſſed alternately under the preſs, and the mixture of the colours produces a print that bears no ſmall reſemblance to a painting. It muſt be confeſſed, however, that what has been hitherto done of this kind falls far ſhort of that degree of perfection of which this art appears ſuſceptible. If they who engrave the beſt in the manner of the crayon were to apply themſelves to this art, there is reaſon to expect they would produce far more finiſhed pieces than we have hitherto ſeen.

V. *To make* FIGURES *appear of* DIFFERENT COLOURS *ſucceſſively.*

(101.) Make a hole in the window ſhutter of a room, through which, when ſhut, a broad beam of light may paſs, that is to be refracted by the large glaſs priſm ABC, *Fig.* 4. which may be made of pieces of mirrors cemented together, and filled with water. Provide another priſm DEF, made of 3 pieces of wood; through the middle of this there muſt paſs an axis on which it is to revolve. This priſm muſt be covered with white paper: and each of its ſides cut through in ſeveral places, ſo as to repreſent different figures, and thoſe of each ſide ſhould likewiſe be different. The inſide of this priſm muſt be hollow, and made quite black, that it may not reflect any of the light that paſſes through the ſides into it. When this priſm is placed near that of glaſs, as in the figure, with one of its ſides EF perpendicular to the ray of light, the figures on that ſide will appear perfectly white: but when it comes into the poſition *gh*, the figures will appear yellow and red; and when it is in the poſition *kl*, they will appear blue and violet. As the priſm is turned round its axis, the other ſides will have a ſimilar appearance. If, inſtead of a priſm, a four or five ſided figure be here uſed, the appearances will be ſtill further diverſified.

(102.) This phenomenon ariſes from the different refrangibility of the rays of light. For when the ſide EF is in the poſition *gh*, it is more ſtrongly illuminated by the leaſt refrangible rays; and wherever they are predominant, the object will appear red or yellow. But when it is on the poſition *kl*, the more refrangible rays being then predominant, it will appear tinged with blue and violet.

VI. *The* SOLAR MAGIC LANTERN.

(103.) Procure a box, of about a foot high, and 18 inches wide, or any other ſimilar dimenſions, and about 3 inches deep. Two of the oppoſite ſides of this box muſt be quite open; and in each of the other ſides let there be a groove, wide enough to paſs a ſtiff paper or paſteboard. This box muſt be faſtened againſt a window on which the ſun's rays fall direct. The reſt of the window ſhould be cloſed up, that no light may enter. Provide ſeveral ſheets of ſtiff paper, which muſt be blacked on one ſide. On theſe papers cut any kind of figures, and placing them alternately in the grooves of the box, with their blacked ſides inwards, look at them through a large and clear glaſs priſm; and if the light be ſtrong, they will appear to be painted with the moſt lively colours in nature. If, on one of theſe papers the form of the rainbow is cut, about ¾ of an inch wide, it will exhibit a lively repreſentation of that in the atmoſphere.

(104.) This experiment may be diverſified, by paſting very thin papers, lightly painted with different colours, over ſome of the parts that are cut out: which will appear to change their colours when viewed through the priſm, and to ſtand out from the paper, at different diſtances, according to the different degrees of refrangibility of the colours with which they are painted. For greater convenience, the priſm may be placed in a ſtand on a table, at the height of the ſpectator's eye, and made to turn round on an axis, that when an agreeable proſpect is obtained, it may be fixed in that poſition.

VII. *The* PRISMATIC CAMERA OBSCURA.

(105.) Make two holes F. *f*, fig. 5. in the ſhutter of a dark chamber, near to each other; and againſt each hole place a priſm ABC, and *a b c*, in a perpendicular direction, that their ſpectrums NM may be caſt on the paper in a horizontal line, and coincide with each other; the red and violet of the one being in the ſame part with thoſe of the other. The paper ſhould be placed at ſuch a diſtance from the priſms that the ſpectrum may be ſufficiently dilated. Provide ſeveral papers nearly of the ſame dimenſions as the ſpectrum, croſs theſe papers, and draw lines parallel to the diviſions of the colours. In theſe diviſions cut out ſuch figures as will have an agreeable effect, as flowers, trees, animals, &c. When one of theſe papers is placed in its proper poſition, hang a black cloth or paper behind it, that none of the rays that paſs through may be reflected and confuſe the phenomenon. The figures cut on the paper will then appear ſtrongly illuminated with all the original colours of nature.

(106.) If, while one of the priſms remains at reſt, the other be revolved on its axis, the continual alteration of the colours will afford a pleaſing variety; which may be further increaſed by turning the priſm round in different directions. When the priſms are ſo placed that the two ſpectrums become coincident in an inverted order of their colours, the red end of one falling on the violet end of the other; if they be then viewed through a 3d priſm DH, held parallel to their length, they will no longer appear coincident, but in the form of two diſtinct ſpectrums, *pt* and *nm*, fig. 6. croſſing one another in the middle, like the letter X; the red of one ſpectrum and the violet of the other, which were coincident at NM, being parted from each other by a greater refraction of the violet to *p* and *m*, than that of the red to *n* and *t*.

(107.) This experiment may be further diverſified by adding two other priſms that ſhall form a ſpectrum in the ſame line, and contiguous to the other; by which not only the variety of figures, but the viciſſitude of colours, will be conſiderably augmented.

VIII. *The* DIATONIC SCALE *of* COLOURS.

(108.) Sir Isaac Newton, in the courſe of his inveſtigations of the properties of light, diſcovered that the length of the ſpaces which the ſeven primary colours poſſeſs in the ſpectrum, exactly correſponds to thoſe of chords that ſound the ſeven notes in the diatonic ſcale of muſic. This is evident by the following experiment.

(109.) In a dark chamber, let a ray of light be largely refracted on a paper, into the ſpectrum AFTMGP, fig. 7. and mark the preciſe boundaries of the ſeveral colours, as *a*, *b*, *c*, &c. Draw lines from thoſe points perpendicular to the oppoſite ſide, and it will appear, that the ſpaces M *r ſ* F, by which the red is bounded; *r q e ſ*, by which the orange is bounded; *q p e d*, by which the yellow is bounded, &c. will be exactly proportioned to the diviſion of a muſical chord for the notes of an octave; that is, as the intervals of theſe numbers 1, 8-9ths, 5-6ths, 3-4ths, 2-3ds, 3-5ths, 9-16ths, 1-half.

IX. Colorific music.

(110.) Father Castel, a Frenchman, in a curious book he has publiſhed on chromatics, ſuppoſes the note *ut* to anſwer to blue in the priſmatic colours; the note *re* to yellow, and *mi* to red. The other tones he refers to the intermediate colours; from whence he conſtructs the following:

(111.) Gamut of Colorific music, *ut*, blue; *ut ſharp*, ſea green; *re*, bright green; *re ſharp*, olive green; *mi*, yellow; *fa*, aurora; *fa ſharp*, orange; *ſol*, red; *ſol ſharp*, crimſon; *la*, violet; *la ſharp*, blue violet; *ſi*, ſky blue; *ut*, blue.

(112.) This gamut, according to his plan, is to be continued in the ſame manner for the following octave; except that the colours are to be more vivid. He ſuppoſes that theſe colours, by ſtriking the eye in the ſame ſucceſſion as the ſounds (to which he makes them analogous) do the ear, and in the ſame order of time, they will produce a correſpondent ſenſation of pleaſure in the mind. It is on theſe general principles, which F. Caſtel has elucidated in his treatiſe, that he has endeavoured, though with little ſucceſs, to eſtabliſh his ocular harpſichord.

(113.) The conſtruction of this inſtrument, as here explained, will ſhow that the effects produced by colours by no means anſwer thoſe of ſounds, and that the principal relation there is between them conſiſts in the duration of the time that they reſpectively affect the ſenſes. Between two circles of paſteboard, of 10 inches of diameter, AB and CD, fig. 8. incloſe a hollow paſteboard cylinder E, 18 inches long. Divide this cylinder into ſpaces half an inch wide, by a ſpiral line that runs round it from top to bottom, and divide its ſurface into ſix equal parts by parallel lines drawn between its two extremities; as is expreſſed in the figure. Let the circle AB, at top, be open; and let that at bottom, CD, be cloſed, and ſupported by an axis or ſcrew, of half an inch diameter, which muſt turn freely in a nut placed at the bottom of a box we ſhall preſently deſcribe. To the axis adjuſt a wooden wheel G, of two inches and an half in diameter, and that has 12 or 15 teeth, which take the endleſs ſcrew H. Let this cylinder be incloſed in a box ILMN (fig. 9.) whoſe baſe is ſquare, and at whoſe bottom there is a nut in which the axis F turns. The endleſs ſcrew H, ſhould come out of the box, that it may receive the handle O, by which the cylinder is to be turned.

(114.) This box being cloſed all round, place over it a tin covering A, which muſt be perforated in different parts; from this cover there muſt hang three or four lights, ſo placed that they may ſtrongly illuminate the inſide of the cylinder. In one ſide of this box (which ſhould be covered with paſteboard), cut 8 apertures, *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, fig. 9. of half an inch wide, and ⅓ of an inch high; they muſt be directly over each other, and the diſtance between them muſt be exactly two inches. It is by theſe openings, which here correſpond to the muſical notes, that the various colours analogous to them are to appear; and which being placed on the paſteboard cylinder, as we have ſhown, are reflected by means of the lights placed within it.

(115.) It is eaſy to conceive, that when the handle O is turned, the cylinder in conſequence riſing half an inch, if it be turned 5 times round, it will ſucceſſively ſhow, at the openings made in the ſide of the box, all thoſe that are in the cylinder itſelf, and which are ranged according to the direction of the inclined lines drawn on it. It is therefore according to the duration of the notes which are to be expreſſed, that the apertures on the cylinder are to be cut. The ſpace between two of the parallel lines drawn vertically on the cylinder, is equal to one meaſure of time; therefore, for every turn of the cylinder, there are ſix meaſures, and thirty meaſures for the air that is to be played by this inſtrument. The ſeveral apertures being made in the ſide of the cylinder, in conformity to the notes of the tune that is to be expreſſed, they are to be covered with double pieces of very thin paper, painted on both ſides with the colours that are to repreſent the muſical notes.

(116.) This experiment might be executed in a different manner, and with a much greater extent; but as the entertainment would not equal the trouble and expenſe, we have thought it ſufficient to give the above, by which the reader will be enabled to judge how far the analogy ſuppoſed by F. Caſtel really exiſts.

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CHROMATISM. *n. ſ.* the natural colour, or tincture of any thing. *Aſh.*

CHROMATOGRAPHY. *n. ſ.* [from χρωμα, colour, and γραφω, to write,] a treatiſe of colours; the art of painting in colours.

CHROMATOPOIA, *n. ſ* [from χρωμα, and ποιεω, to work,] the art of making and compounding colours.

CHROMIS, in ichthylogy, a ſpecies of Sparus.

* CHRONICAL. } *adj.* [from χρονος, time.] A
* CHRONICK. } *chronical* diſtemper is of length; as dropſies, aſthmas, and the like. *Quincy.*—Of diſeaſes ſome are *chronical*, and of long duration; as, quartane agues, ſcurvy, wherein we defer the cure unto more advantageons ſeaſons. *Brown.*—The lady's uſe of theſe excellencies is to divert the old man, when he is out of the pangs of a *chronical* diſtemper. *Spectator.*

(1.) * CHRONICLE. *n. ſ.* [*chronique*, Fr. from χρονος, a time.] 1. A regiſter or account of events in order of time.—

No more yet of this;
For 'tis a *chronicle* of day by day,
Not a relation for a breakfaſt. *Shak.*

2. A hiſtory.—You lean too confidently on thoſe Iriſh *chronicles*, which are moſt fabulous and forged. *Spenſer.*—I give up to hiſtorians the generals and heroes which crowd their annals, together with thoſe which you are to producefor the Britiſh *chronicle*. *Dryd.*

(2.) Chronicle, Parian. See Arundelian marbles, and Parian chronicle.

(3.) Chronicles, agree in moſt reſpects with *Annals*. See Annals.

(4.) Chronicles, Books of, canonical writings of the Old Teſtament. It is uncertain whether *The Books of Kings* or *Chronicles* were written firſt, as each refer to the other. The latter, however, are often more full and comprehenſive than the former: Whence the Greek interpreters call theſe two books Παραλειπομενα, *Supplements*, *Additions*, becauſe they contain ſome circumſtances which are omitted in the other hiſtorical books The Jews make but one book of the Chronicles, under the title of *Dibre-Haiamim*, i. e. *Journals* or *Annals*. Ezra is generally believed to be the author of theſe books. It is certain they were written after the end of the Babyloniſh captivity and the firſt year of the reign of Cyrus, of whom mention is made in the laſt chapter of the 2d book. They are an abridgement of all the ſacred hiſtory, from the beginning of the Jewiſh nation to their firſt return from the captivity, taken out of thoſe books of the Bible which we ſtill have, and out of other annals which the author had then by him. The deſign of the writer was to give the Jews a ſeries of their hiſtory. The Iſt book relates to the riſe and propagation of the people of Iſrael from Adam, and gives a punctual and exact account of the reign of David. The IId book ſets down the progreſs and end of the kingdom of Judah, to the very year of their return from the Babyloniſh captivity

* *To* Chronicle. *v. a.* [from the noun.] 1. To record in chronicle, or hiſtory.—This to rehearſe, ſhould rather be to *chronicle* times than to ſearch into reformation of abuſes in that realm. *Spenſer.* 2. To regiſter; to record.—

For now the devil, that told me I did well,
Says that this deed is *chronicled* in hell. *Shak.*

—I ſhall be the jeſt of the town; nay, in two days I expect to be *chronicled* in ditty, and ſung in woeful ballad. *Congreve.*

* CHRONICLER. *n. ſ.* [from *chronicle.*] 1. A writer of chronicles; a recorder of events in order of time.—

Here gathering *chroniclers*, and by them ſtand
Giddy fantaſtick poets of each land. *Donne.*

2. A hiſtorian; one that keeps up the memory of things paſt.—I do herein rely upon theſe bards, or Iriſh *chroniclers*. *Spenſer.*

CHRONODIX, [from χρονος and δεικνυμι, to ſhew,] a kind of dial; an inſtrument to ſhew the time.

* CHRONOGRAM. *n. ſ.* [χρονος, time, and γραφω, to write.] An inſcription including the date of any action. Of this kind the following is an example:—

Gloria lauſque, *D*eo, ſæ*CL*or*VM* in ſæc*V*la ſunto.

—A *chronogromatical* verſe, which includes not only this year 1660, but numerical letters enough to reach above 1000 years further, until the year 2867. *Howel.*

* CHRONOGRAMMATICAL. *adj.* [from *chronogram.*] Belonging to a chronogram. See the laſt example.

* CHRONOGRAMMATIST. *n. ſ.* [from *chronogram.*] A writer of chronograms.—There are foreign univerſities, where as you praiſe a man in England for being an excellent philoſopher or poet, it is an ordinary character to be a greater *chronogrammatiſt* *Addiſon.*

* CHRONOLOGER. *n. ſ.* [χρονος, time, and λογος, doctrine.] He that ſtudies or explains the ſcience of computing paſt time, or of ranging paſt events according to their proper years. *Chronologers* differ among themſelves about moſt great epochas. *Holder.*

* CHRONOLOGICAL. *adj.* [from *chronology.*] Relating to the doctrine of time.—Thus much touching the *chronological* account of ſome times and things paſt, without confining myſelf to the exactneſs of years.

* CHRONOLOGICALLY. *adv.* [from *chronological.*] In a chronological manner; according to the laws or rules of chronology; according to the exact ſeries of time.

CHRONOLOGICS, *n ſ. plur.* books treating of chronology. *Bailey.*

* CHRONOLOGIST. *n. ſ.* [See CHRONOLOGER.] One that ſtudies or explains time; one that ranges paſt events according to the order of time; a chronologer.—According to theſe *chronologiſts*, the prophecy of the Rabin that the world ſhould but laſt ſix thouſand years, has been long diſproved. *Brown.*

CHRONOLOGY.

INTRODUCTION.

DEFINITIONS *and* HISTORY *of* CHRONOLOGY.

(1.) * CHRONOLOGY. *n. ſ.* [χρονος, time, and λογος, doctrine.] The ſcience of computing and adjuſting the periods of time; as the revolution of the ſun and moon; and of computing time paſt, and referring each event to the proper year.—And the meaſure of the year not being ſo perfectly known to the ancients, rendered it very difficult for them to tranſmit a true *chronology* to ſucceeding ages. *Holder.*—Where I allude to the cuſtoms of the Greeks, I believe I may be juſtified by the ſtricteſt *chronology*; though a poet is not obliged to the rules that confine an hiſtorian. *Prior.*

(2.) CHRONOLOGY conſiſts of two parts. The firſt treats of the proper meaſurement of time, and its ſeveral diviſions; the ſecond, of fixing the dates of the events recorded in hiſtory, and ranging them in the order in which they happened.

(3.) Chronology, comparatively ſpeaking, is but of modern date. The ancient poets appear to have been entirely unacquainted with it; and Homer, the moſt celebrated of them all, mentions nothing like a formal kalendar in any part of his writings. In the moſt early periods, the only meaſurement of time was by the ſeaſons, the revolutions of the ſun and moon, and many ages ſeem to have elapſed before the mode of computation by dating events came into general uſe. Several centuries intervened between the era of the olympic games and the firſt hiſtorians; and ſeveral more between theſe and the firſt authors of chronology.

(4.) When time firſt began to be reckoned, we find its meaſures very indeterminate. The ſucceſſion of Juno's prieſteſſes at Argos ſerved Hellanicus for the regulation of his narrative; while Ephorus reckoned his matters by generations. Even in the hiſtories of Herodotus and Thucydides, we find no regular dates for the events recorded.

(5.) No attempt appears to have been made to eſtabliſh a fixed era, until the time of Ptolemy Philadelphus, who attempted it by compiling and correcting the dates of the olympiads, the kings of Sparta, and the ſucceſſion of the prieſteſſes of Juno at Argos. Eratoſthenes and Apollodorus digeſted the events recorded by them according to the ſucceſſion of the olympiads and of the Spartan kings. The uncertainty of the meaſures of time in the moſt early periods renders the hiſtories of thoſe times equally uncertain; and even after the invention of dates and eras, we find the ancient hiſtorians very inattentive to them, and inaccurate in their computations. Frequently their eras and years were reckoned differently without their being ſenſible of it, or at leaſt without giving the reader any information concerning it; a circumſtance which has rendered the fragments of their works now remaining of very little uſe to poſterity.

(6.) The Chaldean and Egyptian writers are generally acknowledged to be fabulous; and Strabo acquaints us, that Diodorus Siculus, and the other early hiſtorians of Greece, were ill informed and credulous. Hence the diſagreement among the ancient hiſtorians, and the extreme confuſion and contradiction we meet with on comparing their works. Hellanicus and Acuſilaus diſagreed about their genealogies; the latter rejected the traditions of Heſiod. Timæus accuſed Ephorus of falſehood, and the reſt of the world accuſed Timæus. The moſt fabulous legends were impoſed on the world by Herodotus; and even Thucydides and Diodorus, generally accounted able hiſtorians, have been convicted of error.

(7.) The chronology of the Latins is ſtill more uncertain. The records of the Romans were deſtroyed by the Gauls; and Fabius Pictor, the moſt ancient of their hiſtorians, was obliged to borrow the greateſt part of his information from the Greeks. In other European nations the chronology is ſtill more imperfect and of a later date; and even in modern times, a conſiderable degree of confuſion and inaccuracy has riſen from want of attention in the hiſtorians, to aſcertain the dates and epochs with preciſion.

(8.) It is obvious, therefore, how neceſſary a proper ſyſtem of chronology muſt be for the right underſtanding of hiſtory, and likewiſe how very difficult it muſt be to eſtabliſh ſuch a ſyſtem. In this, however, ſeveral learned men have excelled; particularly Julius Africanus, Euſebius of Cæſarea, George Cyncelle, John of Antioch, Dennis, Petau, Cluviar, Calviſius, Uſher, Simſon Marſham, Blair, and Playfair.

(9.) Chronology is founded, 1. On aſtronomical obſervations, particularly of the eclipſes of the ſun and moon, combined with the calculations of the eras and years of different nations. 2. The teſtimonies of credible authors. 3. Thoſe epochs in hiſtory, which are ſo well atteſted and determined, that they have never been controverted. 4. Ancient medals, coins, monuments, and inſcriptions. None of theſe, however, can be ſufficiently intelligible without an explanation of the firſt part, which conſiders the diviſions of time, and of which therefore we ſhall treat in the firſt place.

PART I.

OF THE DIVISIONS OF TIME.

SECT. I. *Of the* COMPUTATION *and* DIVISIONS *of the* DAY.

(10.) The moſt obvious diviſion of time is derived from the apparent revolutions of the celeſtial bodies, particularly of the ſun, which, by the viciſſitudes of day and night becomes evident to the moſt barbarous and ignorant nations. In ſtrict propriety of ſpeech the word *day* ſignifies only that portion of time during which the ſun diffuſes light on any part of the earth; but in the moſt comprehenſive ſenſe, it includes the night alſo, and is called by chronologers a *civil* day; by aſtronomers a *natural*, and ſometimes an *artificial*, day.

(11.) By a CIVIL DAY is meant the interval betwixt the ſun's departure from any given point in the heavens and his return to it; with as much more as anſwers to his diurnal motion eaſtward, which is at the rate of 59 minutes and 8 ſeconds of a degree, or 3 minutes and 57 ſeconds of time. It is alſo called a *ſolar* day, and is longer than a *ſidereal* one, inſomuch that, if the former be divided into 24 equal parts or hours, the latter will conſiſt only of 23 hours 56 minutes. The apparent inequality of the ſun's motion, likewiſe, ariſing from the obliquity of the ecliptic, produces another inequality in the length of the days: and hence the difference betwixt real and apparent time, ſo that the apparent motion of the ſun cannot always be a true meaſure of duration. Thoſe inequalities, however, are capable of being reduced to a general ſtandard, which furniſhes an exact meaſure throughout the year; whence ariſes the differences between mean and apparent time. See ASTRONOMY, *Index*.

(12.) The commencement and concluſion of the day have been very differently reckoned by different nations. The beginning of the day was counted from ſunriſe by the Babylonians, Syrians, Perſians, and Indians. The civil day of the Jews was begun from ſunriſe, and their ſacred one from ſunſet; the latter mode of computation being followed by the Athenians, Arabs, ancient Gauls, and other European nations. According to ſome, the Egyptians began their day at ſunſet, while others are of opinion that they computed from noon or from ſunriſe; Pliny informs us that they computed their civil day from one midnight to another. It is probable, however, that they had different modes of computation in different provinces or cities.

(13.) The Auſonians, the moſt ancient inhabitants of Italy, computed the day from midnight; and the Aſtronomers of Cathay and Oighur in the Eaſt Indies reckoned in the ſame manner. This mode of computation was adopted by Hipparchus, Copernicus, and other aſtronomers, and is now in common uſe among ourſelves. The ASTRONOMICAL DAY, however, as it is called, on account of its being uſed in aſtronomical calculations, commences at noon, and ends at the ſame time the following day. The Mahometans reckon from one twilight to another.

(14.) A very ſingular method of computation takes place in Italy. The civil day commences at ſome indeterminate point after ſunſet; whence the time of noon varies with the ſeaſon of the year. At the ſummer ſolſtice, the clock ſtrikes 16 at noon, and 19 at the time of the winter ſolſtice. Thus the length of each day differs by ſeveral minutes from that immediately preceding or following it. This variation requires a conſiderable difficulty in adjuſting their time by clocks. It is accompliſhed, however, by a ſudden movement which corrects the difference when it amounts to a quarter of an hour; and this it does ſometimes at the end of 8 days, ſometimes at the end of 15, and ſometimes at the end of 40. Information of all this is given by a printed kalendar, which announces, that from the 16th of February, for inſtance, to the 24th, it will be noon at a quarter paſt 18; from the 24th of February to the 6th of March, it will be noon at 18 o'clock preciſely;

from the firſt of June to the 13th of July, the hour of noon will be at 16 o'clock; on the 13th of July it will be at half an hour after 16; and ſo on throughout the different months of the year. This abſurd method of meaſuring the day has long continued, notwithſtanding ſeveral attempts to ſuppreſs it, throughout the whole of Italy, a few provinces only excepted; but the political revolutions which have lately taken place among the Italian States, will probably bring along with them a correction of their chronological computations.

(15.) The SUBDIVISIONS of the day have not been leſs various than the computations of the day itſelf. The moſt obvious diviſion, and which could at no time, nor in no age, be miſtaken, was that of *morning* and *evening*. In proceſs of time the two intermediate points of *noon* and *midnight* were determined; and this diviſion into quarters was in uſe long before the invention of hours.

(16.) From this ſubdiviſion probably aroſe the method uſed by the Jews and Romans of dividing the day and night into 4 vigils or watches. The firſt began at ſun-riſing, or ſix in the morning; the ſecond at 9; the third at 12; and the fourth at 3 in the afternoon. In like manner the night was divided into 4 parts; the firſt beginning at 6 in the evening, the ſecond at 9, the third at 12, and the fourth at three in the morning. The firſt of theſe diviſions was called by the Jews the 3d hour of the day; the ſecond the 6th; the third 9th; and the fourth the 12th, and ſometimes the 11th. Another diviſion in uſe, among theſe nations as well as the Greeks, was that which reckoned the firſt quarter from ſunſet to midnight; the 2d from midnight to ſunriſe; the 3d or morning watch, from morning to noon; and the 4th from noon to ſunſet.

(17.) At what time the more minute ſubdiviſion of the day into HOURS firſt commenced, is uncertain. It does not appear from the writings of Moſes, that he was acquainted with it, as he mentions only the morning, mid-day, evening and ſunſet. Hence we may conclude, that the Egyptians at that time knew nothing of it, as Moſes was well ſkilled in their learning. According to Herodotus, the Greeks received the knowledge of the 12 hours of the day from the Babylonians. It is probable, however, that the diviſion was actually known and in uſe before the name *hour* was applied to it; as Cenſorinus informs us, that the term was not made uſe of in Rome for 300 years after its foundation; nor was it known at the time the XII tables were conſtructed.

(18.) The eaſtern nations divide the day and night in a very ſingular manner; the origin of which is not eaſily diſcovered. The Chineſe have 5 watches in the night, which are announced by a certain number of ſtrokes on a bell or drum. See CHINESE § 21. By the ancient Tartars, Indians, and Perſians, the day was divided into 8 parts, each of which contained 7½ hours. The Indians on the coaſt of Malabar divide the day into ſix parts, called *najikas*; each of theſe ſix parts is ſubdivided into 60 others, called *venaigas* the venaiga into 60 *birpes*; the birpe into 10 *kenikans*; the kenikan into four *mattires*; the mattire into 8 *kannimas or caignodes*; which diviſions, according to our mode of computation, ſtand as follows:

Najika, 24 hours. Venaiga, 24 min. Birpe, 4 ſec. Kenikan, $\frac{2}{5}$ ſec. Mattire, $\frac{1}{10}$ ſec. Caignode, $\frac{1}{80}$ ſec.

(19.) The Chineſe day begins at midnight, and ends with the midnight following. It is divided into 12 hours, each diſtinguiſhed by a particular name and figure. They alſo divide the natural day into 100 parts, and each of theſe into 100 minutes; ſo that the whole contains 10,000 minutes. In the northern parts of Europe, where only two ſeaſons are reckoned in the year, the diviſions of the day and night are conſiderably larger than with us. In Iceland the 24 hours are divided into 8 parts; the firſt of which commences at 3 in the morning; the 2d at 5; the 3d at half an hour after 8; the 4th at 11; the 5th at 3 in the afternoon; the 6th at 6 in the evening; the 7th at 8, and laſt at midnight. In the eaſtern part of Turkeſtan, the day is divided into 12 equal parts, each of which is diſtinguiſhed by the name of ſome animal. Theſe are ſubdivided into 8 *keh*; ſo that the whole 24 hours contain 96 *keh*.

(20.) The modern diviſions of the hour in uſe among us are into minutes, 2ds, 3ds, 4ths, &c. each being a 60th part of the former ſubdiviſion. By the Chaldæans, Jews, and Arabians, the hour is divided into 1080 ſcruples: ſo that one hour contains 60 minutes, and one minute, 28 ſcruples. The ancient Perſians and Arabs were likewiſe acquainted with this diviſion; but the Jews are ſo fond of it, that they pretend to have received it in a ſupernatural manner. "Iſſachar (ſay they) aſcended into heaven, and brought from thence 1080 parts for the benefit of the nation."

(21.) The diviſion of the day being aſcertained, it ſoon became an object to indicate in a public manner the expiration of any particular hour or diviſion; as without ſome general knowledge of this kind, it would be in a great meaſure impoſſible to carry on buſineſs. The methods of announcing this have been likewiſe very different.

(22.) Among the Egyptians it was cuſtomary for the prieſts to proclaim the hours like watchmen among us. The ſame method was followed at Rome; nor was there any other method of knowing the hours until A. A. C. 293, when Papirius Curſor firſt ſet up a ſun dial in the Capitol. A ſimilar method is practiſed among the Turks, whoſe prieſts proclaim from the top of their moſques, the cock-crowing, day-break, mid-day, 3 o'clock in the afternoon, and twilight, being their appointed times of worſhip. As this mode of proclaiming the hour could not but be very inconvenient, as well as imperfect, the introduction of an inſtrument which every one could have in his poſſeſſion, and which might anſwer the ſame purpoſe, muſt have been conſidered as a valuable acquiſition. One of the firſt of theſe was the clepſydra or water clock. See CLEPSYDRA.

(23.) Various kinds of clepſydræ were in uſe among the Egyptians at a very early period. The invention of the inſtrument is attributed to Thoth or Mercury, and it was afterwards improved by Cteſibius of Alexandria. It was a common meaſure of time among the Greeks, Indians and Chaldæans, as well as the Egyptians, but was not introduced into Rome till the time of Scipio Naſica.

The Chineſe Aſtronomers have long made uſe of it; and by its means have divided the zodiac into twelve parts; but it is a very inaccurate meaſure of time, varying, not only according to the quantity of water in the veſſel, but according to the ſtate of the atmoſphere. The clepſydra was ſucceeded by the GNOMON or ſun-dial.—This, at firſt, was no more than a ſtile erected perpendicularly to the horizon; and it was a long time before the principles of it came to be thoroughly underſtood. The invention is with great probability attributed to the Babylonians, from whom the Jews received it before the time of Ahaz, when we know that a ſun-dial was already erected at Jeruſalem.

(24.) The Chineſe and Egyptians were alſo acquainted with the uſe of the dial at a very early period, and it was conſiderably improved by Anaximander or Anaximenes; one of whom is for that reaſon looked upon to be the inventor. Various kinds of dials, however, were invented and uſed in different nations long before their introduction at Rome. Papirius Curſor erected the firſt, and 30 years after, Valerius Meſſala brought one from Sicily, which was uſed in Rome for no leſs than 99 years, though conſtructed for a Sicilian latitude, and conſequently incapable of ſhowing the hours exactly in any other place; but at laſt another was conſtructed by L. Philippus, capable of meaſuring time with greater accuracy.

(25.) It was long after the invention of dials before mankind began to form any idea of CLOCKS; nor is it well known at what period they were firſt invented. A clock was ſent by Pope Paul I. to Pepin king of France, which at that time was ſuppoſed to be the only one in the world. A very curious one was alſo ſent to Charles the Great from the khalif Haroun Alraſchid, which the hiſtorians of the time ſpeak of with ſurpriſe and admiration: but the greateſt improvement was that of Mr Huygens, who added the pendulum to it. Still, however, the inſtruments for dividing time were found to be inaccurate for nice purpoſes. The expanſion of the materials by heat, and their contraction by cold, would cauſe a very perceptible alteration in the going of an inſtrument in the ſame place at different times of the year, and much more if carried from one climate to another.

(26.) Various methods have been contrived to correct this; which indeed can be done very effectually at land by a certain conſtruction of the pendulum; but at ſea, where a pendulum cannot be uſed, the inaccuracy is of conſequence much greater: nor was it thought poſſible to correct the errors ariſing from theſe cauſes in any tolerable degree, until the late invention of Mr Harriſon's time-piece, which may be conſidered as making perhaps as near an approach to perfection as poſſible.

Sect. II. *Of* Weeks.

(27.) We now proceed to the larger diviſions of time, which more properly belong to chronology, and which muſt be kept on record, as no inſtrument can be made to point them out. Of theſe the diviſion into WEEKS of 7 days is one of the moſt ancient, and probably took place from the creation of the world. Some, indeed are of opinion, that the week was invented ſome time after for the more convenient notation of time; but whatever may be in this, we are certain that it is of the higheſt antiquity; being coeval with the creation, and that even the moſt rude and barbarous nations have uſed it. The Greeks, however, notwithſtanding their learning, were ignorant of this diviſion; and M. Goguet informs us, that they were almoſt the only nation who were ſo. By them the month of 30 days was divided into 3 times 10, and the days of it named accordingly: thus the 15th day of the month was called the *ſecond fifth*, or fifth of the ſecond tenth; the 24th was called the *third fourth*, or the fourth day of the third tenth. This method was in uſe in the days of Heſiod, and it was not until ſeveral ages had elapſed, that the uſe of weeks was received into Greece from the Egyptians.

(28.) The inhabitants of Cathay, in the northern part of China, were likewiſe unacquainted with the week of 7 days, but divided the year into ſix parts of 60 days each. They had alſo a cycle of 15 days, which they uſed as a week. The week was likewiſe unknown to the ancient Perſians and to the Mexicans; the former having a different name for every day of the month, and the latter making uſe of a cycle of 13 days.

(29.) The week of 7 days was adopted by almoſt all other nations; and it is remarkable, that one day in the week has always been accounted ſacred by moſt nations. Thus Saturday was conſecrated to pious purpoſes among the Jews, Friday by the Turks, Tueſday by the Africans of Guinea, and Sunday by the Chriſtians. Hence alſo the origin of FERIÆ or *holidays*, frequently made uſe of in Syſtems of Chronology.

Sect. III. *Of* Months.

(30.) The next diviſion of time is that of *months*. This appears to have been, if not coeval with the creation, at leaſt in uſe before the flood. As this diviſion is naturally pointed out by the revolution of the moon, the months of all nations were originally lunar; until after ſome conſiderable advances had been made in ſcience, the revolutions of that luminary were compared with the ſun, and thus the limits of the month fixed with greater accuracy.

(31.) The diviſion of the year into 12 months, as being founded on the number of full revolutions of the moon in that time, has alſo been very general. Sir John Chardin, however, informs us that the Perſians divided the year into 24 months; and the Mexicans into 18 months of 20 days each; but ſuch unnatural diviſions certainly do not merit the title of *months*. The months generally contained 30 days, or 29 and 30 days alternately; though this rule was far from being without exception. The months of the Latins conſiſted of 16, 18, 22, or 36 days; and Romulus gave his people a year of 10 months, or 304 days. The Kamtſchadales divide the year into 10 months; reckoning the time proper for labour to be 9 months, and the winter ſeaſon, when they are obliged to remain inactive, only as one month.

(32.) The cuſtom of giving names to the different months is very ancient, though it appears to have been more modern than the departure of the Iſraelites out of Egypt, as they would otherwiſe undoubtedly have carried it with them: but for a conſiderable time after their ſettlement in Canaan, they diſtinguiſhed the months only by their order of *firſt*, *ſecond*, &c. After their return from the Babyloniſh captivity, they adopted the Chaldean names. Other nations adopted various names, and arranged the months according to their fancy. From this laſt circumſtance ariſes the variety in the dates of the months: for as the year has been reckoned from different ſigns in the ecliptic, neither the number nor the quantity of months have been the ſame, and their ſituation has likewiſe been altered by the neceſſary intercalations. Theſe intercalations became neceſſary on account of the exceſs of the ſolar above the lunar year; and the months compoſed of intercalary days are likewiſe called EMBOLISMAL.

(33.) Theſe emboliſmal months are either *natural* or *civil*. By the former, the ſolar and lunar years are adjuſted to one another; and the latter ariſe from the defect of the civil year itſelf. The *adar* of the Jews, which always conſiſts of 30 days, is an example of the natural emboliſmal month.

(34.) The Romans divided their months into kalends, nones and ides; which they had a ſingular method of reckoning *backwards*. See KALENDS. The 2d, 3d, 4th, 5th, 6th and 7th of March, May, July, and October, were the nones of theſe months; but in the other months were the 2d, 3d, 4th, and 5th days only. Thus the 5th of January was its nones; the 4th was *pridie nonarum*; the third, *tertio nonarum*; and the 2d *quarto*. The ides contained 8 days in every month, and were 9 days diſtant from the nones. Thus the 15th day of theſe 4 months was the ides, but in the others the 13th; the 12th was *pridie iduum*, and the 11th *tertio iduum*. The ides were ſucceeded by the kalends; our 14th of January; for inſtance, being the 19th *of*, or *before the kalends* of February; the 15th was the 18th of the kalends, and ſo on till the 31ſt of January, which was *pridie kalendarum*; and February 1ſt was the kalends.

(35.) In Europe, the month is either ASTRONOMICAL or CIVIL. The former is meaſured by the motion of the heavenly bodies; the latter conſiſts of a certain number of days ſpecified by the laws, or civil inſtitutions. The aſtronomical months, being, for the moſt part regulated by the motions of the ſun and moon, are thus divided into *ſolar* and *lunar*, of which the former is ſometimes alſo called *civil*. The aſtronomical ſolar month is the time which the ſun takes up in paſſing through a ſign of the ecliptic.

(36.) The lunar month is *periodical*, *ſynodical*, *ſidereal*, and *civil*. See ASTRONOMY, *Index*. The ſynodical lunar month is the time that paſſes between any conjunction of the moon with the ſun and the conjunction following. It includes the motion of the ſun eaſtward during that time; ſo that a mean lunation conſiſts of 29 d. 12 h. 44′ 2″ 8921. The ſidereal lunar month is the time of the mean revelation of the moon with regard to the fixed ſtars. As the equinoctial points go backwards about 4″ in the ſpace of a lunar month, the moon muſt, in conſequence of this retroceſſion, arrive at the equinox ſooner than at any fixed ſtar, and conſequently the mean ſidereal revolution muſt be longer than the mean periodical one. The latter conſiſts of 27d. 7h. 43′. 4″, 6840. The civil lunar month is computed from the moon, to anſwer the ordinary purpoſes of life; and as it would have been inconvenient, in the computation of lunar months, to have reckoned odd parts of days, they have been compoſed of 30 days, or of 29 and 30 alternately, as the neareſt round numbers.

(37.) When the month is reckoned from the firſt appearance of the moon after her conjunction, it is called the *month of illumination*. The Arabs, Turks, and other nations, who uſe the era of the Hegira, follow this method of computation. As 12 lunar months, however, are 11 days leſs than a ſolar year, Julius Cæſar ordained that the month ſhould be reckoned from the courſe of the ſun, and not of the moon; and that they ſhould conſiſt of 30 and 31 days alternately, February only excepted, which was to conſiſt of 28 days commonly, and of 29 in leap years.

SECT. IV. *Of* YEARS.

(38.) THE higheſt natural diviſion of time is into YEARS. At firſt, however, it is probable that the courſe of the ſun through the ecliptic would not be obſerved, but that all nations would meaſure their time by the revolutions of the moon. We are certain, at leaſt, that the Egyptian year conſiſted originally of a ſingle lunation; though at length it included 2 or 3 months, and was determined by the ſtated returns of the ſeaſons. As the eaſtern nations, however, particularly the Egyptians, Chaldeans, and Indians, applied themſelves very early to aſtronomy, they found, by comparing the motions of the ſun and moon together, that one revolution of the former included above 12 of the latter. Hence a year of 12 lunations was formed, in every one of which were reckoned 30 days; and hence alſo the diviſion of the ecliptic into 360 degrees.

(39.) The LUNI-SOLAR YEAR, conſiſting of 360 days, was in uſe long before any regular intercalations were made; and hiſtorians inform us, that the year of all ancient nations was luniſolar. Herodotus relates, that the Egyptians firſt divided the year into 12 parts by the aſſiſtance of the ſtars, and that every part conſiſted of 30 days. The Thebans corrected this year by adding 5 intercalary days to it. The old Chaldean year was reformed by the Medes and Perſians; and ſome of the Chineſe miſſionaries have informed us, that the luniſolar year was alſo corrected in China; that the ſolar year was aſcertained in that country to very conſiderable exactneſs. The Latin year, before Numa's correction of it, conſiſted of 360 days, of which 304 were divided into ten months; to which were added two private months not mentioned in the kalendar.

(40.) The imperfection of this method of computing time is now very evident. The luniſolar year was about 5¼ days ſhorter than the true ſolar year, and as much longer than the lunar. Hence the months could not long correſpond with the ſeaſons; and even in ſo ſhort a time as 34 years, the winter months would have changed places with thoſe of ſummer. From this rapid variation, Mr PLAYFAIR takes notice that a paſſage in HERODOTUS,

RODOTUS, by which the learned have been exceedingly puzzled, may receive a ſatisfactory ſolution, viz. that "in the time of the ancient Egyptian kings, the ſun had twice ariſen in the place where it had formerly ſet, and twice ſet where it had ariſen." By this he ſuppoſes it is meant, "that the beginning of the year had twice gone through all the ſigns of the ecliptic; and that the ſun had ariſen and ſet twice in every day and month of the year." This, which ſome have taken for a proof of moſt extravagant antiquity, he further obſerves, might have happened in 138 years only; as in that period there would be a difference of nearly 2 years between the ſolar and lunar year.

(41.) Such evident imperfections could not but produce a reformation every where; and accordingly we find that there was no nation which did not add a few intercalary days at certain intervals. We are ignorant, however, of the perſon who was the firſt inventor of this method. The Theban prieſts attributed the invention to Mercury or Thoth; and it is certain that they were acquainted with the year of 365 days at a very early period. The length of the ſolar year was repreſented by the celebrated golden circle of OSYMANDYAS of 365 cubits circumference; and on every cubit of which was inſcribed a day of the year, together with the heliacal riſings and ſettings of the ſtars. This monarch is ſuppoſed to have reigned in the 11th or 13th century before the Chriſtian era.

(42.) The Egyptian ſolar year being nearly ſix hours ſhorter than the true one, this inaccuracy, in time, produced another revolution; ſome circumſtances attending which ſerve to fix the date of the diſcovery of the length of the year, and which form the above deſcription of the golden circle, we may ſuppoſe to have been made during the reign of Oſymandyas. The inundation of the Nile was annually announced by the heliacal riſing of Sirius, to which the reformers of the kalendar adjuſted the beginning of the year, ſuppoſing that it would remain immoveable. In a number of years, however, it appeared that their ſuppoſitions in this were ill-founded. By reaſon of the inequality above mentioned, the heliacal riſing of Sirius gradually advanced nearly at the rate of one day in four years; ſo that in 1461 years it completed a revolution, by ariſing on every ſucceeding day of the year, and returning to the point originally fixed for the beginning of the year.

(43.) This period, equal to 1460 Julian years, was termed the *great Egyptian year*, or CANICULAR CYCLE. From the accounts we have of the time that the canicular cycle was renewed, the time of its original commencement may be gathered with tolerable certainty. This happened, according to Cenſorinus, A. D. 138. Reckoning backward therefore from this time for 1460 years, we come to A. A. C. 1322, when the ſun was in Cancer, about 14 or 15 days after the ſummer ſolſtice, which happened on July 5. The Egyptians uſed no intercalation till the time of Auguſtus, when the corrected Julian year was received at Alexandria by his order; but even this order was obeyed only by the Greeks and Romans who reſided in that city; the ſuperſtitious natives refuſing to make any addition to the length of the year, which had been ſo long eſtabliſhed among them.

(44.) At what preciſe period the true year was obſerved to conſiſt of nearly 6 hours more than 365 days, is quite uncertain. Though the prieſts of Thebes claim the merit of the diſcovery, Herodotus makes no mention of it; neither did Thales, who introduced the year of 365 days into Greece, ever uſe any intercalation. Plato and Eudoxus are ſaid to have obtained it as a ſecret from the Egyptians about 80 years after Herodotus, and to have carried it into Greece; which ſhowed, that the knowledge of this form of the year was at that time recent, and confined to a few learned men.

(45.) The ancient Jewiſh year was luniſolar; and we are informed by tradition, that Abraham preſerved in his family, and tranſmitted to his poſterity, the Chaldean form of the year, conſiſting of 360 days; which remained the ſame without any correction until the date of the era of NABONASSAR. The ſolar year was adopted among them after their return from the Babyloniſh captivity; but when ſubjected to the ſucceſſors of Alexandria in Syria, they were obliged to admit the lunar year into the kalendar. To adjuſt this year to the courſe of the ſun, they added at certain periods a month to Adar, and called it *Veadar*. They compoſed alſo a cycle of 19 years, in 7 of which they inſerted the intercalary month. This correction was intended to regulate the months in ſuch a manner, as to bring the 15th of Niſan to the equinoctial point; and likewiſe the courſes of the ſeaſons and feaſts in ſuch a manner, that the corn might be ripe at the paſſover as the law required.

(46.) The Roman year inſtituted by Romulus, was evidently very imperfect, when NUMA undertook to reform it. To make a complete lunar year, he added 50 days to the 304 of Romulus; and from every one of his months, which conſiſted of 31 and 30 day, he borrowed one day. Of theſe additional 60 days he compoſed two months; calling the one *January*, and the other *February*.

(47.) Various other corrections were made; but when JULIUS CÆSAR obtained the ſovereignty of Rome, he found that the months had conſiderably receded from the ſeaſons to which Numa had adjuſted them. To bring them forward to their places, he formed a year of 15 months, or 445 days; which, on account of its length, and the deſign with which it was formed, has been called the *year of confuſion*. It terminated on the firſt of January, A. A. C. 45, and from this period the civil year and months were regulated by the courſe of the ſun. The year of Numa being ten days ſhorter than the ſolar year, two days were added by Julius to every one of the months of January, Auguſt, and December; and one to April, June, September, and November. He ordained likewiſe, that an intercalary day ſhould be added every 4th year to the month of February, by reckoning the 24th day, or *ſixth* of the kalends of March, twice over. Hence this year was ſtyled BISSEXTILE, or *twice ſextile*, and alſo *leap year*, from its leaping a day more than a common year.

(48.) The JULIAN YEAR has been uſed by modern chronologers, as being a meaſure of time extremely ſimple and ſufficiently accurate. It is ſtill, however, ſomewhat imperfect; for as the true ſolar year conſiſts of 365 d. 5 h. 48′ 45½″, it appears that in 131 years after the Julian correction, the ſun muſt have arrived one day too ſoon at the equinoctial point. During Cæſar's reign the vernal equinox had been obſerved by Soſigenes on the 25th of March; but by the time of the Nicene council it had gone backward to the 21ſt. The cauſe of the error was not then known; but in 1582, when the equinox happened on the 11th of March, it was thought proper to give the kalendar its laſt correction.

(49.) Pope GREGORY XIII. having invited to Rome a conſiderable number of mathematicians and aſtronomers, employed ten years in the examination of their ſeveral formulæ, and at laſt gave the preference to that of ALOISIUS and ANTONINUS LELIUS, who were brothers. Ten days were now cut off in the month of October, and the 5th of that month was reckoned the 15th. To prevent the ſeaſons from receding in time to come, he ordained that one day ſhould be added every forth or biſſextile year as before; and that the 1600th year of the Chriſtian era, and every fourth century thereafter, ſhould be a biſſextile or leap year. One day therefore is to be intercalated in the years 2000, 2400, 2800, &c. but in the other centuries, as 1700, 1800, 1900, 2100, &c. it is to be ſuppreſſed, and theſe are to be reckoned as common years. Even this correction, however, is not abſolutely exact; but the error muſt be very inconſiderable, and ſcarce amounting to a day and an half in 5000 years.

(50.) The commencement of the year has been determined by the date of ſome memorable event, ſuch as the creation of the world, the univerſal deluge, a conjunction of planets, the incarnation of our Saviour, &c. and of courſe has been referred to different points in the ecliptic. The Chaldæan and the Egyptian years were dated from the autumnal equinox. The eccleſiaſtical year of the Jews began in the ſpring; but, in civil affairs, they retained the epoch of the Egyptian year. The ancient Chineſe reckoned from the new moon neareſt to the middle of Aquarius; but, according to ſome recent accounts, the beginning of their year was transferred, (A. A. C. 1740,) to the new moon neareſt to the winter ſolſtice. This likewiſe is the date of the Japaneſe year. Diemſchid, or Gemſchid, king of Perſia, obſerved, on the day of his public entry into Perſepolis, that the ſun entered into Aries. In commemoration of this event, he ordained the beginning of the year to be removed from the autumnal to the vernal equinox. This epoch was denominated *Neuruz*, viz. new day; and is ſtill celebrated with great pomp and feſtivity. See EPOCHS.

(51.) The ancient Swediſh year commenced at the winter ſolſtice, or rather at the time of the ſun's appearance in the horizon, after an abſence of about 40 days. The feaſt of this epoch was ſolemniſed on the 20th day after the ſolſtice. Some of the Grecian ſtates computed from the vernal, ſome from the autumnal equinox, and others from the ſummer tropic. The year of Romulus commenced in March, whence the four laſt months, *September*, *October*, *November*, and *December*, were really what their names import, the 7th, 8th, 9th, and 10th months. Numa, without altering theſe names, began the year in January, which Cæſar continued. The Turks and Arabs date the year from the 16th of July; and the American Indians reckon from the firſt appearance of the new moon of the vernal equinox. The church of Rome has fixed new-year's-day on the Sunday that correſponds with the full moon of the ſame ſeaſon. The Venetians, Florentines, and Piſans in Italy, and inhabitants of Treves in Germany, begin the year at the vernal equinox. The ancient clergy reckoned from the 25th of March; and this method was obſerved in Britain, until the introduction of the new ſtyle; (A. D. 1752,) after which our year commenced on the 1ſt day of January.

SECT. V. *Of* CYCLES *and other* PERIODICAL REVOLUTIONS *of* YEARS.

(52.) Beſides theſe natural diviſions of time ariſing immediately from the revolutions of the heavenly bodies, there are others formed from ſome of the leſs obvious conſequences of theſe revolutions, which are called *cycles*, from the Greek κυκλος, *a circle*. The moſt remarkable of theſe are the following:

(53.) I. The CYCLE OF THE SUN is a revoluton of 28 years, in which time the days of the months return again to the ſame days of the week; the ſun's place to the ſame ſigns and degrees of the ecliptic on the ſame months and days, ſo as not to differ one degree in 100 years; and the leap years begin the ſame courſe over again with reſpect to the days of the week on which the days of the months fall.

(54.) II. The CYCLE OF THE MOON, or the GOLDEN NUMBER, is a revolution of 19 years; in which time, the conjunctions, oppoſitions, and other aſpects of the moon, are within an hour and a half of being the ſame as they were on the ſame days of the months 19 years before.

(55.) III. The INDICTION is a revolution of 15 years, uſed only by the Romans for indicating the times of certain payments made by the ſubjects to the republic: It was eſtabliſhed by Conſtantine, A. D. 312.

(56.) The year of our Saviour's birth, according to the vulgar era, was the 9th year of the ſolar cycle, the firſt year of the lunar cycle; and the 312th year after his birth was the firſt year of the Roman indiction. Therefore, to find the year of the ſolar cycle, add 9 to any given year of Chriſt, and divide the ſum by 28, the quotient in the number of cycles elapſed ſince his birth, and the remainder is the cycle for the given year: If nothing remains, the cycle is 28. To find the lunar cycle, add one to the given year of Chriſt, and divide the ſum by 19; the quotient is the number of cycles elapſed in the interval, and the remainder is the cycle for the given year: If nothing remains, the cycle is 19. Laſtly, ſubtract 312 from the given year of Chriſt, and divide the remainder by 15; and what remains after this diviſion is the indiction for the given year: If nothing remains, the indiction is 15.

(57.) Although the deficiency in the lunar cycle of an hour and an half every 19 years be but ſmall, yet in time it becomes ſo ſenſible as to make a whole natural day in 310 years. So that, although this cycle be of uſe, when the golden numbers are rightly placed againſt the days of the months in the kalendar, as in the Common Prayer Books, for finding the days of the mean conjunctions or oppoſitions of the ſun and moon, and conſequently the time of Eaſter; it will only ſerve for 310 years, old ſtyle. For as the new and full moons anticipate a day in that time, the golden numbers ought to be placed one day earlier in the kalendar for the next 310 years to come. Theſe numbers were rightly placed againſt the days of new moon in the kalendar, by the council of Nice, A. D. 325; but the anticipation, which has been neglected ever ſince, is now grown almoſt into 5 days: And therefore all the golden numbers ought now to be placed 5 days higher in the kalendar for the old ſtyle than they were at the time of the ſaid council; or 6 days lower for the new ſtyle, becauſe at preſent it differs 11 days from the old.

(58.) In the following table, the golden numbers under the months ſtand againſt the days of new moon in the left hand column, for the new ſtyle; adapted chiefly to the ſecond year after leap-year, which is the neareſt mean for all the four; and will ſerve till the year 1900. Therefore, to find the day of new moon in any month of a given year till that time, look for the golden number of that year (which will be found by TABLE II.) under the deſired month, and againſt it you have the day of new moon in the left hand column. Thus, ſuppoſe it were required to find the day of new moon in September, 1798; the golden number for that year is 13, which I look for under December, and right againſt it in the left hand column you will find 7, which is the day of new moon in that month. *N. B.* If all the golden numbers, except 17 and 6, were ſet one day lower in the table, it would ſerve from the beginning of the year 1900 till the end of the year 2199.

(59.) TABLE I.

Days.	*Jan.*	*Feb.*	*March.*	*April.*	*May.*	*June.*	*July.*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
1	9		9	17	17	6				11		19
2		17			6	14	14	3	11		19	
3	17	6	17	6			3	11		19	8	8
4	6		6	14	14	3			19	8		16
5		14			3	11	11	19	8		16	
6	14	3	14	3			19			16	5	5
7	3		3	11	11	19		8	16			13
8		11			19	8	8	16	5	5	13	
9	11	19	11	19						13		2
10			19	8	8	16	16	5	13		2	10
11	19	8					5	13	2	2	10	
12	8	16	8	16	16	5				10		18
13					5	13	13	2	10		18	7
14	16	5	16	5			2	10	18	18	7	
15	5		5	13	13	2				7		15
16		13			2	10	10	18	7		15	
17	13	2	13	2			18	7		15	4	4
18	2		2	10	10	18			15			12
19		10			18	7	7	15	4	4	12	
20	10	18	10	18			15			12	1	1
21	18		18	7	7	15		4	12			9
22		7			15	4	4	12	1	1	9	
23	7	15	7	15			12			9	17	17
24			15	4	4	12		1	9			6
25	15	4			12		1	9	17	17	6	
26	4		4	12		1				6		15
27		12		1	1	9	9	17	6		14	
28	12	1	12		9		17	6	14	14	3	3
29	1		1	9		17				3		11
30					17	6	6	14	3		11	
31	9		9				14	3		11		19

(60.) The IId. table ſhows the golden number for 4000 years after the birth of Chriſt, by looking for the even hundreds of any given year at the left hand, and for the reſt to make up that year at the head of the table; and where the columns meet, you have the golden number for the given year. Thus, ſuppoſe the golden number was wanted for the year 1798, look for 1700 at the left hand of the table, and for 98 at the top of it; then guiding your eye downward from 98 to the angle over againſt 1700, you will find 13, which is the golden number for that year. But as the lunar cycle of 19 years ſometimes includes 5 leap years, and at other times only 4, this table will ſometimes vary a day from the truth in leap years after Februray. And it is impoſſible to have one more correct, unleſs we extend it to 4 times 19 or 76 years; in which there are 19 leap years without a remainder. But even then to have it of perpetual uſe, it muſt be adapted to the old ſtyle; becauſe, in every centurial year not diviſible by 4, the regular courſe of leap years is interrupted in the new; as was the caſe in the year 1800.

(61.) TABLE

(61.) TABLE II.

TABLE, *ſhewing the Golden Number, (which is the ſame both in the Old and New Stile,) From the Chriſtian Era, to A. D. 4000.*

Years leſs than an hundred.

Hund$^{\text{r}}$eds of Years.			0 19 38 57 76 95	1 20 39 58 77 96	2 21 40 59 78 97	3 22 41 60 79 98	4 23 42 61 80 99	5 24 43 62 81	6 25 44 63 82	7 26 45 64 83	8 27 46 65 84	9 28 47 66 85	10 29 48 67 86	11 30 49 68 87	12 31 50 69 88	13 32 51 70 89	14 33 52 71 90	15 34 53 72 91	16 35 54 73 92	17 36 55 74 93	18 37 56 75 94
50	1900	3800	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
100	2000	3900	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5
200	2100	4000	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10
300	2200	&c.	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
400	2300	—	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1
500	2400	—	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6
600	2500	—	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11
700	2600	—	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
800	2700	—	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2
900	2800	—	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7
1000	2900	—	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12
1100	3000	—	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1200	3100	—	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3
1300	3200	—	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8
1400	3300	—	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9	10	11	12	13
1500	3400	—	19	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1600	3500	—	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	1	2	3	4
1700	3600	—	10	11	12	13	14	15	16	17	18	19	1	2	3	4	5	6	7	8	9
1800	3700	—	15	16	17	18	19	1	2	3	4	[illegible]	6	7	8	9	10	11	12	13	14

(62.) IV. The CYCLE OF EASTER, or the DIONYSIAN PERIOD, is a revolution of 532 years, found by multiplying the ſolar cycle 28, by the lunar cycle 19. If the new moons did not anticipate upon this cycle, Eaſter day would always be the Sunday next after the firſt full moon which follows the 21ſt of March. But, on account of the above anticipation, to which no proper regard was paid before the alteration of the ſtyle, the eccleſiaſtical Eaſter has ſeveral times been a week different from the true Eaſter within this laſt century: which inconvenience is now remedied by making the table, which uſed to find Eaſter for ever, in the Common Prayer Book, of no longer uſe than the lunar difference from the new ſtyle will admit of. The earlieſt Eaſter poſſible is the 22d of March, the lateſt the 25th of April. Within theſe limits are 35 days, and the number belonging to each of them is called the *number of direction*; becauſe thereby the time of Eaſter is found for any given year.

(63.) The firſt ſeven letters of the alphabet are commonly placed in the annual almanacks, to ſhow on what days of the week the days of the months fall throughout the year. As one of thoſe letters ſtands againſt Sunday, as it is printed in a capital form, and called DOMINICAL LETTER; the other ſix being inſerted in ſmall characters, to denote the other ſix days of the week. As a common Julian year contains 365 days, if this number be divided by 7 there will remain one day: whence the year begins and ends on the ſame day of the week; and therefore the next year will begin on the day following. Hence, when January begins on Sunday, A is the dominical letter for that year: Then, becauſe the next year begins on Monday, the Sunday will fall on the 7th day, to which is annexed the 7th letter G, which therefore will be the dominical letter for all that year; and as the 3d year will begin on Tueſday, the Sunday will fall on the ſixth day; therefore F will be the dominical letter for that year. Whence it is evident, that the dominical letters will go annually in a retrograde order thus, G, F, E, D, C, B, A. And, in the courſe of 7 years, if they were all common ones, the ſame days of the week and dominical letters would return to the ſame days of the months. But becauſe there are 366 days in a leap year, if this number be divided by 7, there will remain two days over and above the 52 weeks, of which the year conſiſts. And therefore, if the leap year begins on Sunday, it will end on Monday; and the next year will begin on Tueſday, the firſt Sunday whereof muſt fall on the 6th of January, to which is annexed the letter F, and not G, as in common years. From the leap year thus returning every 4th year, the order of the dominical letters is interrupted; and the ſeries cannot return to its firſt ſtate till after 4 times 7 or 28 years; and then the ſame days of the months return in order to the ſame days of the week as before.

(64.) The great **Julian period** ariſes from the multiplication of the ſolar cycle of 28 years into the lunar cycle of 19 years, and the Roman indiction of 15 years. It conſiſts of 7980 years, and had its beginning 764 years before Strauchius's ſuppoſed year of the creation, (for no later could all the three cycles begin together,) and is not yet completed. It therefore includes all other cycles, periods, and eras. There is but one year in the whole period that has the ſame numbers for the three cycles of which it is made up: And therefore, if hiſtorians had remarked in their writings the cycles of each year, there had been no diſpute about the time of any action recorded by them.

(65.) The **Dionysian or vulgar era** of Chriſt's birth was about the end of the year of the Julian period 4713; and conſequently the firſt year of his age, according to that account, was the 4714th year of the ſaid period. Therefore, if to the current year of Chriſt we add 4713, the ſum will be the year of the Julian period. So the year 1798 will be found to be the 6511th year of that period. Or, to find the year of the Julian period anſwering to any given year before the firſt year of Chriſt, ſubtract the number of that given year from 4714, and the remainder will be the year of the Julian period. Thus, the year 585 before the firſt year of Chriſt (which was the 584th before his birth) was the 4129th year of the ſaid period. To find the cycles of the ſun, moon, and indiction for any given year of this period, divide the given year by 28, 19, and 15; the three remainders will be the cycles ſought, and the quotients the number of cycles run ſince the beginning of the period. So in the above 4714th year of the Julian period, the cycle of the ſun was 10, the cycle of the moon 2, and the cycle of indiction 4; the ſolar cycle having run through 168 courſes, the lunar 248, and the indiction 314.

PART II.

HISTORICAL CHRONOLOGY.

Sect. I. *Of* Astronomical Observations.

(66.) The firſt great foundation of hiſtorical chronology is aſtronomical obſervations. The eclipſes of the ſun and moon, and the aſpects of the other planets, have been juſtly called *public and celeſtial characters of the times*, as their calculations afford chronologers infallible proofs of the preciſe epochs, in which a great number of the moſt ſignal events in hiſtory have occurred. So that in chronological matters we cannot make any great progreſs, if we are ignorant of the uſe of aſtronomical tables, and the calculation of eclipſes. The ancients regarded the latter as prognoſtics of the fall of empires, of the loſs of battles, of the deaths of monarchs, &c. To this ſuperſtition,—to this wretched ignorance, we happily owe the vaſt labours that hiſtorians have taken to record ſo great a number of them. The moſt able chronologers have collected them with ſtill greater labour. Calviſius, for example, founds his chronology on 144 eclipſes of the ſun, and 127 of the moon, which he ſays he had calculated.

(67.) The grand conjunction of the two ſuperior planets, Saturn and Jupiter, which, according to Kepler, occurs once in 800 years in the ſame point of the zodiac, and which has happened only 8 times ſince the creation (the laſt time in the month of December 1603,) may alſo furniſh chronology with inconteſtible proofs. The ſame may be ſaid of the tranſit of Venus over the ſun, which has been obſerved in our days, and all the other uncommon poſitions of the planets.

(68.) But among theſe celeſtial and natural characters of times, there are alſo ſome that are named *civil* or *artificial*, and which, nevertheleſs, depend on aſtronomic calculation. Such are the ſolar and lunar cycles; (See § 52—54.) the Roman indiction; (§ 55.) the feaſt of Eaſter; (§ 62.) the biſſextile year; the jubilees; the ſabbatic years; the Olympic games of the Greeks; and the hegira of the Mahometans, &c. Aſtronomical chronology alſo teaches us to calculate the preciſe year of the Julian period, in which any remarkable epoch happened. And to theſe may be added the periods, eras, epochs, and years of different nations, ancient and modern. Thus the period or era of the Jews commences with the creation of the world; that of the ancient Romans with the foundation of the city of Rome; that of the Greeks at the eſtabliſhment of the Olympic games; that of Nebuchadnezzar, with the advancement of the firſt king of Babylon to the throne; the Yezdegerdic years, with the laſt king of the Perſians of that name; the hegira of the Turks with the flight of Mahomet from Mecca to Medina, &c. The year of the birth of Chriſt was the 4713th year of the Julian period, according to the common method of reckoning.

Sect. II. *Of the* Testimonies *of* Authors.

(69.) The ſecond principal foundation of hiſtoric chronology is the teſtimony of authors. Though no man has a right to pretend to infallibility, or to be regarded as a ſacred oracle, yet it would be making a very unjuſt judgment of mankind, to treat them all as dupes or impoſtors; and it would be an injury offered to public integrity, were we to doubt the veracity of authors univerſally eſteemed, and of facts that are in themſelves right worthy of belief. The man would ſurely be reckoned wrong in the head, who ſhould doubt that there have been ſuch cities as Athens, Sparta, Rome, Carthage, &c. or that Xerxes reigned in Perſia, and Auguſtus in Rome: whether Hannibal ever was in Italy; or that the emperor Conſtantine built Conſtantinople, &c. The unanimous teſtimony of the moſt reſpectable hiſtorians will not admit any doubt of theſe matters. When a hiſtorian is allowed to be completely able to judge of an event, and to have no intent of deceiving by his relation, his teſtimony is irrefutable. But to avoid the danger of adopting error for truth, and to be ſatisfied of a fact that appears doubtful in hiſtory, we may make uſe of the 4 following rules, as they are founded in reaſon.

(70.) I. A particular regard is due to the teſtimonies of thoſe who wrote at the time the events happened, and that have not been contradicted by any cotemporary author of known authority. Who can doubt, for example, of the truth of the facts related by admiral Anſon, in his hiſtory of his voyage round the world? The admiral ſaw all the facts there mentioned with his own eyes, and publiſhed his book when two hundred companions of his voyage were ſtill living in London, and could have contradicted him immediately, if he had given any falſe or exaggerated relations.

(71.) II. After the cotemporary authors, we ſhould give more credit to thoſe who lived near the time the events happened, than to thoſe who lived at a diſtance.

(72.) III. Thoſe doubtful hiſtories, which are related by authors that are but little known, can have no weight if they are at variance with reaſon, or eſtabliſhed tradition.

(73.) IV. We muſt diſtruſt the truth of a hiſtory that is related by modern authors, when they do not agree among themſelves in ſeveral circumſtances, nor with ancient hiſtorians, who are to be regarded as original ſources. We ſhould eſpecially doubt the truth of thoſe brilliant portraits, that are drawn at pleaſure by ſuch as never knew the perſons they are intended for, and even made ſeveral centuries after their deceaſe.

(74.) The moſt pure and moſt fruitful ſource of ancient hiſtory is doubtleſs to be found in the Holy Bible. Let us here for a moment ceaſe to regard it as divine, and let us preſume to conſider it only as a common hiſtory. Now, when we regard the writers of the books of the Old Teſtament, and conſider them ſometimes as authors, ſometimes as ocular witneſſes, and ſometimes as reſpectable hiſtorians; whether we reflect on the ſimplicity of the narration, and the air of truth that is there conſtantly viſible; or, whether we conſider the care that the people, the governments, and the learned men of all ages, have taken to preſerve the true text of the Bible; or that we have regard to the happy conformity of the chronology of the holy ſcriptures with that of profane hiſtory: or, if we obſerve the admirable harmony that is between theſe books and the moſt reſpectable hiſtorians, as Joſephus and others; and laſtly, when we conſider that the books of the holy ſcripture furniſh us alone with an accurate hiſtory of the world from the creation, through the line of patriarchs, judges, kings, and princes of the Hebrews; and that we may, by its aid, form an almoſt entire ſeries of events down to the birth of Chriſt, or the time of Auguſtus, which comprehends a ſpace of about 4000 years, ſome ſmall interruptions excepted, and which are eaſily ſupplied by profane hiſtory: when all theſe reflections are juſtly made, we muſt allow that the ſcriptures form a ſeries of books which merit the firſt rank among all the ſources of ancient hiſtory.

(75.) It has been objected, that theſe books contain contradictions; but the moſt able interpreters have reconciled theſe ſeeming contradictions. It has been ſaid, that the chronology of the Hebrew text and the Vulgate do not agree with the chronology of the verſion of the Septuagint; but the ſoundeſt critics have ſhown that they may be made to agree. It has been alſo objected, that the ſcriptures abound with miracles and prodigies; but all nature may be ſaid to abound with prodigies. There are limits in every ſcience, beyond which human knowledge cannot go, and beyond which all is miraculous. But what wiſe philoſopher will preſume to ſay, that any thing is *impoſſible* for *infinite power*; or that the Almighty by giving certain laws to what we call *nature*, has thereby limited and circumſcribed his own omnipotence, to all eternity, in ſuch a manner, that he can in no inſtance deviate from or alter them, however much particular circumſtances in his own moral government of the univerſe may require ſuch a deviation?

Sect. III. *Of* Æras *or* Epochs.

(76.) As there are certain fixed points in the heavens, from which aſtronomers begin their computations, ſo there are certain points of time from which hiſtorians begin to reckon; and theſe points or roots of time are called Æras or Epochs. Theſe form the third principal foundation of chronology. They are thoſe fixed points in hiſtory that have never been conteſted, and of which there can, in fact, be no doubt. Chronologers fix on the events that are to ſerve as epochs, in a manner quite arbitrary; but this is of little conſequence, provided the dates of theſe epochs agree, and that there is no contradiction in the facts themſelves.

(77.) The moſt remarkable eras are, thoſe of the Creation, the flood, the Greek Olympiads, the building of Rome, the era of Nabonaſſar, the death of Alexander, the birth of Chriſt, the Arabian Hegira, and the Perſian Jeſdegird: All which, together with ſeveral others of leſs note, have their beginnings fixed by chronologers to the years of the Julian period, to the age of the world at thoſe times, and to the years before and after the birth of our Saviour.

(78.) The vulgar era of Chriſt's birth was never ſettled till the year 527, when Dionyſius Exiguus, a Roman abbot, fixed it to the end of the 4713th year of the Julian period, which was four years too late; for our Saviour was born before the death of Herod. And, according to the teſtimony of Joſephus (*B.* xvii. *ch.* 8.) there was an eclipſe of the moon in the time of Herod's laſt illneſs; which eclipſe appears by our aſtronomical tables to have been in the year of the Julian period 4710, March 13th, at 3 hours paſt mid-night, at Jeruſalem. Now, as our Saviour muſt have been born ſome months before Herod's death, ſince in the interval he was carried into Egypt, the lateſt time in which we can fix the true era of his birth is about the end of the 4709th year of the Julian period.

Sect. IV. *Of* Ancient Medals, Coins, Monuments, &c.

(79.) Medals, monuments, and inſcriptions, form the 4th and laſt principal foundation, or aſſiſtant of chronology. It is ſcarce more than 150 years ſince cloſe application has been made to the ſtudy of theſe; and we owe to the celebrated Spanheim the greateſt obligations, for the progreſs that is made in this method: his excellent work, *De præſtantia et uſu numiſmatum antiquorum*, has ſhown the great advantages of it; and it is evident that theſe monuments are the moſt authentic witneſſes that can be produced.

(80.) The celebrated Mr Addiſon too wrote an expreſs treatiſe on this important uſe of ancient medals. By the aid of medals M. Vaillant has compoſed his judicious hiſtory of the kings of Syria, from the time of Alexander the Great to that of Pompey: they have been, moreover, of the greateſt ſervice in elucidating all ancient hiſtory, eſpecially that of the Romans; and even ſometimes that of the middle age. Their uſe is more fully ſpoken of under the article Medals. What we here ſay of medals, is to be underſtood equally, in its full force, of ancient inſcriptions, and of all other authentic monuments that have come down to us.

Sect. V. *Of the* UNCERTAINTY *of* ANCIENT CHRONOLOGY.

(81.) Every reader of diſcernment will readily allow, that theſe 4 foundations of chronology afford clear lights, and are excellent guides to conduct us through the thick darkneſs of antiquity. We muſt confeſs, however, that theſe guides are not infallible, nor the proofs that they afford mathematical demonſtrations. In fact, with regard to hiſtory in general, and ancient hiſtory in particular, ſomething muſt be always left to conjecture and hiſtoric faith. We muſt not therefore paſs over in ſilence thoſe objections, which authors of the greateſt reputation have made againſt the certainty of chronology.

(82.) I. The prodigious difference there is between the Septuagint Bible and the Vulgate, in point of chronology, occaſions an embarraſſment, which is the more difficult to avoid, as we cannot poſitively ſay on which ſide the error lies. The Greek Bible counts, for example, from the creation of the world to the birth of Abraham, 1500 years more than the Hebrew and Latin Bible, &c.

(83.) II. It is extremely difficult to aſcertain the years of the Judges of the Jewiſh nation, in the Bible, or the ſucceſſion of the kings of Judah and Iſrael. The ſcripture never marks if the years are current or complete. We cannot ſuppoſe that a patriarch, judge, or king, lived exactly 60, 90, 100, or 969 years, without any odd months or days.

(84.) III. The different names that the Aſſyrians, Egyptians, Perſians, and Greeks, have given to the ſame prince, have alſo contributed not a little to embarraſs all ancient chronology. Three or four princes of Perſia have born the name of Aſſuerus, or Ahaſuerus, though they had alſo other names. If we did not know that Nabuchodnoſor, Nabucodroſor, Nebuchadnezzar, and Nabucolaſſar, were names of the ſame man, we ſhould ſcarcely believe it. Sargon is Sennacherib; Ozias is Azarias; Sedecias is Mattanias; Joachas is alſo called Sellum; Aſaraddon, Eſarhaddon or Aſarhaddon, is called Aſenaphar by the Cuthæans; and by an oddity, of which we do not know the origin, Sardanapalus is called by the Greeks Tenos Concoleros.

(85.) IV. There remain to us but few monuments of the firſt monarchs of the world. Numberleſs books have been loſt, and many of thoſe which have come down to us are mutilated or altered by tranſcribers. The Greeks began to write very late. Herodotus, their firſt hiſtorian, was of a credulous diſpoſition, and believed all the fables that were related by the Egyptian prieſts. The Greeks were in general vain, partial, and held no nation in eſteem but their own. The Romans were ſtill more infatuated with notions of their own merit and grandeur. Their hiſtorians were as unjuſt as their ſenate, towards other nations, many of whom were far more reſpectable.

(86.) V. The eras, the years, the periods and epochs, were not the ſame in each nation; and they, moreover, began at different ſeaſons of the year. All this has thrown ſo much obſcurity over chronology, that it appears to be beyond all human capacity totally to diſperſe it. Chriſtianity itſelf had ſubſiſted near 1200 years, before they knew preciſely how many years had paſſed ſince the birth of our Saviour. They ſaw clearly that the vulgar era was defective, but it was a long time before they could comprehend, that it required four whole years to make up the true period.

(87.) Abbe Dionysius, who, in 532, was the firſt among the Chriſtians to form the era of that grand epoch, and to count the years from that time, to make their chronology altogether Chriſtian, erred in his calculation, and led all Europe into his error. Chronologers enumerate 132 contrary opinions of authors concerning the year in which the Meſſiah appeared, M. Vallemont names 64, all celebrated writers. Among all theſe, however, there are none who reckon more than 7000, or leſs than 3700 years from the creation. But even this difference is enormous. The moſt moderate fix the birth of Chriſt in the 4000th year of the world. The reaſons, however, on which they found their opinions are various and arbitrary.

(88.) Notwithſtanding theſe uncertainties, Providence has ſo diſpoſed all things, that there remain ſufficient lights to enable us nearly to connect the ſeries of events: for in the firſt 3000 years of the world, where profane hiſtory is defective, we have the chronology of the Bible to direct us; and after that period, where we find more obſcurity in the chronology of the holy ſcriptures, we have, on the other hand, greater lights from profane authors. It is this period that begins the time which Varro calls *hiſtoric*: as, ſince the time of the Olympiads, the truth of ſuch events as have happened ſhines clear in hiſtory. Chronology, therefore, draws its principal lights from hiſtory; and, in return, ſerves it as a guide. See History, and the Chart annexed.

Sect. VI. CHRONOLOGICAL TABLE.

(89.) REMARKABLE EVENTS, DISCOVERIES, *and* INVENTIONS, *from the* CREATION, *to the* YEAR 1798.

A. A. C.	
4008	The creation of the world, and of Adam and Eve.
4007	The birth of Cain.
3608	Tents invented by Jabal; muſical inſtruments by Jubal; and metallurgy by Tubal Cain.
3078	The death of Adam.
3017	Enoch, for his piety, tranſlated to Heaven.
2352	The old world deſtroyed by a deluge which continued 377 days.

2247 The tower of Babel built by Noah's poſterity; their language confounded, and the people diſperſed into different nations.

2237 About this time, Noah is ſuppoſed to have left his rebellious offspring, and to have led a colony of the more tractable into the eaſt, where he or one of his ſucceſſors founded the Chineſe monarchy.

2234 The celeſtial obſervations begun at Babylon, where learning and the ſciences firſt had their riſe.

2188 Miſraim, the ſon of Ham, founds the kingdom of Egypt, which laſted 1663 years, About the ſame time Nimrod founds that of Babylon.

2059 Ninus, the ſon of Belus, founds the kingdom of Aſſyria, which laſted above 1000 years.

1985 Abraham leaves Haran to go into Canaan, which begins the ſojourning of 430 years. About this time Zoroaſter and Hermes are ſuppoſed to have flouriſhed.

1961 Sodom and Gomorra deſtroyed.

1856 The kingdom of Argos, in Greece, begins under Inachus.

1822 Memnon the Egyptian invents letters.

1715 Prometheus firſt ſtruck fire from flints.

1635 The death of Joſeph, prime miniſter of Egypt.

1574 Aaron born in Egypt.

1571 Moſes born, adopted by Pharaoh's daughter, and educated in Egyptian learning.

1556 A colony of Saites brought from Egypt into Greece by Cecrops, who begins the kingdom of Athens.

1555 Moſes performs many miracles in Egypt. and departs from that kingdom with 600,000 Iſraelites, beſides children, which completes the 430 years of ſojourning. Soon after, he delivers the law, and eſtabliſhes the tabernacle and ark.

1546 Troy founded by Scamander.

1515 Thirty-one kingdoms of Canaan ſubdued by Joſhua; and the kingdom of Iſrael eſtabliſhed in their ſtead. The Sabbatical year commences.

1503 The deluge of Deucalion.

1496 The council of Amphictyons eſtabliſhed at Thermopylæ.

1493 Cadmus carried the Phenician letters into Greece, and built the citadel of Thebes.

1490 Sparta built by Lacedemon. Aaron appointed the firſt high prieſt of the Iſraelites.

1485 The firſt ſhip that appeared in Greece brought from Egypt, by Danaus, to Rhodes.

1420. Troy built by Dardanus.

1452 The Pentateuch written in the land of Moab.

1451 Death of Moſes, and the Iſraelites under Joſhua paſs the river Jordan.

1406 Iron found in Greece, from the accidental burning of the woods.

1356 Gideon defeats the Midianites.

1344 The kingdom of Mycenæ begins.

1326 The Iſthmian games inſtituted at Corinth.

1325 The Egyptian canicular year began July 20th.

1307 The Olympic games inſtituted by Pelops.

300 The Lupercalia inſtituted

1294 The firſt colony came from Italy into Sicily.

1264 The 2d colony came from Italy into Sicily.

1252 The city of Tyre built.

1250 Jephthah defeats the Ammonites.

1243 A colony of Arcadians conducted by Evander into Italy.

1233 Carthage founded by the Tyrians.

1225 The Argonautic expedition.

1219 Samſon exhibits his extraordinary ſtrength.

1204 The rape of Helen by Paris, which gave riſe to the Trojan war.

1194 The deſtruction of Troy.

1176 Salamis in Cyprus built by Teucer.

1152 Alba Longa founded by Aſcanius.

1130 The kingdom of Sicyon ended.

1124 Thebes built by the Bœotians. Amphion teaches them muſic.

1115 The mariners compaſs known in China.

1104 The expedition of the Heraclidæ into Peloponneſus; the migration of the Dorians thither; and the end of the kingdom of Mycenæ.

1102 The kingdom of Sparta commenced.

1070 The kingdom of Athens ended, and Archons eſtabliſhed.

1051 David beſieged and took Jeruſalem.

1044 Migration of the Ionian colonies. Smyrna built.

1008 The Temple built and dedicated by Solomon.

996 Solomon prepared a fleet on the Red Sea to ſend to Ophir.

986 Samos and Utica in Africa built.

979 The kingdom of Iſrael divided.

974 Jeruſalem taken and plundered by Shiſhak king of Egypt.

911 The prophet Elijah flouriſhed.

900 The Aſſyrian monarchy ended under Sardanapalus, and that of the Medes erected by Arbaces.

895 Money firſt made of gold and ſilver at Argos.

884 Olympic games reſtored by Iphitus and Lycurgus.

873 The art of ſculpture in marble diſcovered.

869 Scales and meaſures invented by Phidon.

864 The city of carthage enlarged by Dido.

821 Nineveh taken by Arbaces.

814 The kingdom of Macedon begins.

801 The city of Capua in Campania built.

799 The kingdom of Lydia began.

786 The ſhips, called *Triremes*, invented by the Corinthians.

779 The race of kings in Corinth ended.

776 The era of the Olympiads begin.

760 The Ephori eſtabliſhed at Sparta.

758 Syracuſe built by Archias of Corinth.

754 The government of Athens changed to a republic.

753 Rome built by Romulus, which gives riſe to a new æra.

747 The era of Nabonaſſar commenced on the 1ſt day of Thoth, or the 26th of Feb.

746 The government of Corinth changed into a republic,

743 The firſt war between the Meſſenians and Spartans.

724 Mycenæ reduced by the Spartans.

723 A colony of the Meſſenians ſettled at Regium.

720 Samaria taken; the kingdom of Iſrael ended, and the ten tribes carried captives, by Salmanezer. The firſt eclipſe of the moon on record.

713 Gela in Sicily built.

703 Corcyra built by the Corinthians.

702 Ecbatana in Media built by Deioces.

685 The ſecond Meſſenian war under Ariſtomenes.

670 Byzantium built by a colony of Athenians.

666 The city of Alba deſtroyed.

648 Cyrene in Africa founded.

634 Cyaxares beſieges Nineveh, but is obliged to raiſe the ſiege by an incurſion of the Scythians, who remained maſters of Aſia for 28 years.

624 Draco publiſhed his inhuman laws at Athens.

610 Pharaoh Necho attempted to make a canal from the Nile to the Red Sea, but failed.

607 By his order ſome Phenicians ſailed from the Red Sea round Africa, and returned by the Mediterranean.

606 The firſt captivity of the Jews by Nebuchadnezzar. Nineveh deſtroyed by Cyaxares.

600 Thales travels into Egypt, acquires the knowledge of geometry, aſtronomy, and philoſophy; returns to Greece, calculates eclipſes, gives general notions of the univerſe, and maintains the unity of the deity. His ſcholar, Anaximander, invents maps, globes, and the ſigns of the zodiac.

598 Jehoiachin, king of Judah, carried captive, by Nebuchadnezzar.

594 Solon made Archon at Athens.

591 The Pythian games inſtituted in Greece, and tragedy firſt acted.

588 The firſt irruption of the Gauls into Italy.

586 Jeruſalem taken, after a ſiege of 18 months, by Nebuchadnezzar.

581 The Iſthmian games reſtored.

580 Money firſt coined at Rome.

571 Tyre taken by Nebuchadnezzar after a ſiege of 13 years.

566 The firſt cenſus at Rome, when the number of citizens was found to be 84,000

562 The firſt comedy at Athens acted upon a moveable ſcaffold.

559 Cyrus the firſt king of the Medes and Perſians.

538 Babylon taken, and its monarchy ended by Cyrus.

536 Cyrus iſſues an edict for the return of the Jews

534 The temple founded by the Jews.

526 Learning greatly encouraged at Athens, and a public library firſt founded.

525 Egypt conquered by Cambyſes

520 The ſecond edict to rebuild Jeruſalem.

515 The 2d temple finiſhed under Darius

510 Hippias baniſhed from Athens.

509 Tarquin, the laſt king of Rome, expelled, and a republican government eſtabliſhed, which laſted 461 years.

508 The firſt alliance between the Romans and Carthaginians.

507 The ſecond cenſus at Rome; 130,000 citizens.

504 Sardis burnt by the Athenians, which occaſioned the Perſian invaſion of Greece.

498 Largius created the firſt dictator at Rome.

497 The Saturnalia inſtituted, The number of Roman citizens 150,700.

493 Tribunes created at Rome; or, in 584.

490 The battle of Marathon, September 28th.

486 Æſchylus, the Greek poet, firſt gains the prize of tragedy.

483 Queſtors created at Rome.

481 Xerxes, king of Perſia, begins his expedition againſt Greece.

480 The defence of Thermopylæ by Leonidas, and the ſea-fight at Salamis.

476 The number of Roman citizens reduced to 103,000.

469 The third Meſſenian war.

466 The number of Roman citizens increaſed to 124,214.

458 Ezra ſent from Babylon to Jeruſalem, with the captive Jews and the veſſels of gold and ſilver, &c. being 490 years before the crucifixion of our Saviour.

456 The Secular Games firſt celebrated at Rome.

454 The Romans ſend to Athens for Solon's laws.

451 The Decemvirs created at Rome and the law of the XII. tables compiled and ratified.

449 The Decemvirs baniſhed.

445 Military tribunes created at Rome.

443 Cenſors created at Rome.

441 The battering ram invented by Artemones.

432 The Metonic cycle began July 15th.

431 The Peloponneſian war began which laſted 27 years.

430 The hiſtory of the old Teſtament concludes. Malachi, the laſt of the prophets. A plague over the known world.

405 The Athenians entirely defeated by Lyſander which occaſions the loſs of the city, and ruin of the Athenian power.

401 The retreat of 10,000 Greeeks under Xenophon. The 30 tyrants expelled from Athens, and democratic government reſtored.

400 Socrates, the founder of moral philoſophy among the Greeks, put to death for his ſublime doctrines, by the Athenians, who ſoon after repent, and erect a ſtatue of braſs to his memory.

399. The feaſt of Lectiſternium inſtituted. Catapultæ invented by Dionyſius.

394 The Corinthian war begun.

590 Rome burnt by the Gauls.

387 The peace of Antalcidas between the Greeks and Perſians The number of Roman citizens amounted to 152,583.

384 Dionyſius begins the firſt Punic war.

379 The Bœotian war commences.

375 A general combination of the Greek ſtates againſt the Lacedemonians.

373 A great earthquake in Peloponneſus.

371 The Lacedemonians defeated by Epaminondas at Leuctra.

367 Prætors eſtabliſhed in Rome. The Licinian law paſſed.

363 Epaminondas killed at the battle of Mantinea.

359 The obliquity of the ecliptic obſerved to be 23° 49' 10".

358 The Social war begun.

357 Dionyſius expelled from Syracuſe. A tranſit of the moon over Mars obſerved

356 The ſacred war begun in Greece. Alexander the Great born.

343 Dionyſius II. expelled from Syracuſe. Commencement of the Syraouſan era.

338 Philip of Macedon gains the battle of Chæronæa, and thus attains to the ſovereignty of Greece.

335 Thebes taken and raſed by Alexander the Great.

334 The Perſians defeated at Granicus, May 22d.

333 The Perſians defeated at Iſſus.

332 Alexander Takes Tyre and marches to Jeruſalem.

331 Alexandria built. Darius entirely defeated at Arbela.

339 Alexander takes Babylon, and the principal cities of the Perſian empire. The Calippic period commences. The Scots monarchy founded, according to Buchanan. by Fergus I.

328 Alexander paſſes Mount Caucaſus, and marches into India.

327 He defeats king Porus, and founds ſeveral cities.

326 The famous ſedition of Corcyra.

324 Alexander the Great dies at Babylon.

323 His dominions divided by his officers.

316 His mother and family murdered.

315 Rhodes almoſt deſtroyed by an inundation.

311 The Appian way, aqueducts, &c. conſtructed at Rome.

308 The cities of Greece recovered their liberties for a ſhort time.

307 Antioch, Seleucia, Laodicea, and other cities, founded by Seleucus.

301 Antigonus defeated and killed at Ipſus.

299 The firſt barbers came from Sicily to Rome.

294 The number of effective men in Rome amounts to 270,000.

293 The firſt ſun-dial erected at Rome by Papirius Curſor.

285 Dionyſius, of Alexandria, began his aſtronomical era on Monday June 26, being the firſt who found the exact ſolar year to conſiſt of 365 days 5 hours and 49 minutes. The watch-tower of Pharos built. Ptolemy Philadelphus, king of Egypt, employs 72 interpreters to tranſlate the Old Teſtament into the Greek languages.

284 The foundation of the Achæan republic laid.

283 The college and library founded at Alexandria.

282 The Tarentine war begins.

280 Pyrrhus invades Italy.

279 A cenſus at Rome. The number of citizens 278,222.

269 The firſt coining of ſilver at Rome.

265 The number of Roman citizens augmented to 292,224.

264 The firſt Punic war begins, and continues 23 years. The chronology of the Arundelian marbles compoſed.

262 A tranſit of Mercury over the Bull's horn; the planet being in 23° of ♉ , and the ſun in 20° 30′ ♈.

260 Provincial queſtors eſtabliſhed at Rome. The Romans firſt engage in naval affairs, and defeat the Carthaginians at ſea.

255 Regulus taken priſoner by the Carthaginians under Xantippus.

252 A cenſus at Rome: 297,897 citizens.

247 Another. The citizens 251,212.

246 The records of China deſtroyed.

241 Concluſion of the firſt Punic war.

240 Comedies firſt acted at Rome.

237 Hamilcar, the Carthaginian, cauſes his ſon Hannibal, at 9 years old, to ſwear eternal enmity to the Romans.

236 The Tartars expelled from China.

235 Rome at peace with other nations. The temple of Janus ſhut.

231 Corſica and Sardinia ſubdued by the Romans. The firſt divorce at Rome.

230 The obliquity of the ecliptic obſerved by Eratoſthenes to be 23° 51′ 20″.

224 The Coloſſus at Rhodes overturned by an earthquake.

219 The art of ſurgery introduced at Rome.

218 Commencement of the 2d Punic war. Hannibal paſſes the Alps and invades Italy.

216 The Romans defeated at Cannæ, May 21ſt.

214 Syracuſe beſieged by Marcellus.

209 A cenſus at Rome: 227,107 citizens.

208 Aſdrubal invades Italy; but is defeated and killed.

206 Gold firſt coined at Rome.

202 Hannibal defeated by Scipio at Zama.

201 Concluſion of the ſecond Punic war.

194 Sparta and Hither Spain ſubdued by the Romans.

192 A cenſus at Rome. The number of citizens 243,704.

191 Antiochus defeated by the Romans at Thermopylæ.

190 The firſt Roman army enters Aſia, and from the ſpoils of Antiochus brings the Aſiatic luxury firſt to Rome.

188 The Spartans obliged to renounce the inſtitutions of Lycurgus.

179 A cenſus at Rome: 273,244 citizens.

173 The Jewiſh high prieſthood ſold by Antiochus Epiphanes.

170 Paper invented in China. The temple of Jeruſalem plundered by Antiochus.

169 A cenſus at Rome: 212,805 citizens.

168 Macedon reduced to the form of a Roman province. The firſt library erected at Rome.

165 The temple of Jeruſalem purified by Judas Maccabeus.

164 A cenſus at Rome: 327,032 citizens.

12 Hipparchus began his aſtronomical obſervations at Rhodes.

161 Philoſophers and rhetoricians baniſhed from Rome.

150 The third Punic war commenced.

146 Corinth deſtroyed. Carthage raſed to the ground by the Romans. A remarkable comet in Greece.

143 Hipparchus began his new cycle of the moon, conſiſting of 111,035 days.

141 The Numantine war commenced.

135 The hiſtory of the Apocrypha ends.

133 Numantia deſtroyed by Scipio.

124 A cenſus at Rome: 390,736 citizens.

105 The Cimbri and Teutones defeated the Romans.
102 The Teutones and Ambrones defeated by Marius.
88 Rome beſieged by the Marian faction.
82 Sylla created perpetual dictator.
69 A cenſus at Rome: 450,000 citizens.
66 Catiline's conſpiracy.
55 Julius Cæſar's firſt expedition into Britain. Craſſus defeated and killed by the Parthians.
51 Gaul, reduced to a Roman province.
50 A cenſus at Rome: 320,000 citizens.
48 The battle of Pharſalia, between Cæſar and Pompey, in which the latter is defeated. The Alexandrian library, conſiſting of 400,000 valuable books, burnt by accident.
45 The war of Africa, in which Cato kills himſelf. The ſolar year introduced by Cæſar.
44 Cæſar, after having fought 50 pitched battles, and ſlain 1,192,000 men, killed in the ſenate-houſe.
42 The republicans defeated at Philippi.
31 The battle of Actium fought, in which Mark Anthony and Cleopatra are totally defeated by Octavius.
30 Alexandria taken by Octavius, upon which Anthony and Cleopatra kill themſelves, and Egypt is reduced to a Roman province.
29 A cenſus at Rome: 4,101,017 citizens.
27 Octavius, by a decree of the ſenate, obtains the title of Auguſtus Cæſar, and an abſolute exemption from the laws. The pantheon at Rome built.
19 Rome at the height of its glory, The temple of Jeruſalem rebuilt by Herod. The magnificent aqueducts at Rome, conſtructed by Agrippa.
8 A cenſus at Rome: 4,233,000 citizens.
5 The temple of Janus ſhut by Auguſtus, as an emblem of univerſal peace, and
JESUS CHRIST born, on Monday, Decem. 25.

A. D.
1 The Vulgar Chriſtian era commenced from January 1; the Saviour of the world being then 5 years of age.
8 Jeſus Chriſt diſputes with the doctors in the temple.
14 A ceſus at Rome: 4,037,000 citizens.
16 Mathematicians and magicians expelled from Rome.
17 Twelve cities in Aſia deſtroyed by an earthquake.
21 Pilate made governor of Judæa.
25 Jeſus baptized in Jordan by John.
29 He is crucified at Jeruſalem.
31 Stephen ſtoned, and St Paul converted
39 St Matthew writes his Goſpel. Pilate kills himſelf. A conjunction of Saturn, Jupiter, and Mars.
42 The diſciples firſt called Chriſtians at Antioch.
43 Claudius Cæſar's expedition into Britain.
44 St Mark writes his Goſpel.
50 London founded by the Romans.
51 Caractacus, the Britiſh king, carried priſoner to Rome.
52 The council of the Apoſtles at Jeruſalem.
55 St Luke writes his Goſpel.
56 Rotterdam built.
59 Nero puts his mother and brothers to death: and perſecutes the Druids in Britain.
60 Chriſtianity introduced into Britain.
61 Voadicea, the Britiſh queen, defeats the Romans; but is conquered ſoon after by Suetonius.
62 St Paul is ſent in bonds to Rome; and writes his epiſtles between A. D. 51 and 66.
63 The Acts of the Apoſtles written. A great earthquake in Aſia.
64 Rome ſet on fire by Nero, and burnt for ſix days; upon which began the firſt perſecution of the Chriſtians.
65 Many prodigies ſeen about Jeruſalem.
66 Martyrdom of St Peter and St Paul.
70 While the factious Jews are deſtroying one another with mutual fury, Titus Veſpaſian takes Jeruſalem, and raſes it to the ground.
73 The philoſophers baniſhed from Rome by Veſpaſian.
79 The cities of Pompeii and Herculaneum deſtroyed by an eruption of Veſuvius.
80 The Capitol and Pantheon at Rome deſtroyed by fire.
83 The philoſophers expelled Rome by Domitian.
85 Julius Agricola, to protect the civilized Britons from the incurſions of the Caledonians, builds a line of forts between the Forth and the Clyde; defeats the Caledonians under Galgacus on the Grampian hills; and firſt diſcovers Britain to be an iſland, by ſailing round it.
86 The Capitoline games inſtituted by Domitian.
88 The ſecular games celebrated at Rome.
93 The empire of the Huns in Tartary deſtroyed by the Chineſe. St John baniſhed to Patmos.
94 The ſecond perſecution of the Chriſtians under Domitian.
96 St John wrote his Revelation.
97 St John wrote his Goſpel.
103 Dacia reduced to a Roman province.
105 A great earthquake in Aſia and Greece.
107 The third perſecution under Trajan.
114 Armenia reduced to a Roman province. A great earthquake in China.
115 Aſſyria ſubdued by Trajan. An inſurrection of the Jews, who murder 200,000 Greeks and Romans. A violent earthquake at Antioch.
120 Nicomedia and other cities ſwallowed up by an earthquake.
121 The Caledonians reconquer from the Romans all the ſouthern parts of Scotland; upon which the emperor Adrian builds a wall between Newcaſtle and Carliſle.
130 Jeruſalem rebuilt by Adrian.
132 The 2d Jewiſh war commenced.
134 Lollius Urbicus, the Roman general, repairs Agricola's forts, which he joins by a wall 4 yards thick.
135 The 2d Jewiſh war ends, when the Jews were all baniſhed Judea.
139 Juſtin writes his firſt apology for the Chriſtians.
141 A number of hereſies appear about this time.
146 The worſhip of Serapis introduced at Rome.
152 The emperor Antonius Pius ſtops the perſecution of the Chriſtians. An inundation of the Tyber, and an earthquake at Rhodes.

165 The

163 The fourth perſecution, under Marcus Aurlius Antoninus, which was at laſt ſtopt. by that excellent emperor.

166 The Romans ſend ambaſſadors to China.

168 A plague over the known world.

188 The Capitol at Rome deſtroyed by lightning,

191 A great part of Rome burnt.

203 The fifth perſecution under Severus.

205 An earthquake in Wales.

209 Severus's wall in Britain built.

218 Two comets appeared at Rome. The courſe of the moſt remarkable from E. to W.

222 The Roman empire begins to decline, and the Barbarians begin their irruptions, though bravely oppoſed by Alexander.

225 Mathemeticians allowed to teach publicly at Rome.

236 The ſixth perſecution, under Maximinus.

241 The Franks firſt mentioned in hiſtory.

250 The ſeventh perſecution, under Decius.

252 A dreadful peſtilence in Ethiopia, which ſpread over the world. The 8th perſecution, under Gallus, who firſt bought a peace from the Goths, and agreed to pay them annual tribute.

253 Europe ravaged by the Scythians and Goths.

258 The 9th perſecution, under Valerian.

260 Valerian taken priſoner by Sapor, king of Perſia, and flead alive. The Scythians ravage the Roman empire. The temple of Diana at Epheſus burnt.

261 A great plague throughout the Roman empire.

262 Earthquakes in Europe, Aſia, and Africa; and 3 days of darkneſs.

273 Palmyra taken by the Romans.

274 Silk firſt brought from India.

276 Wines firſt made in Britain.

277 The Franks ſettled in Gaul.

284 The Diocleſian era commenced Auguſt 29th, or September 17th.

287 Carauſius proclaimed emperor of Britain.

289 A great comet viſible in Meſopotamia for 29 days.

291 The emperors, Diocleſian, and Maximian, and the two Cæſars, Conſtantius and Galerius, march to defend the four quarters of the empire.

297 Alexandria deſtroyed by Diocleſian.

303 The 10th perſecution, under Diocleſian.

305 The two emperors reſign, and the two Cæſars ſucceed them.

311 Conſtantius dies in Britain, and Conſtantine the Great begins to reign.

312 Peſtilence all over the Eaſt. Cycle of indiction began.

313 The 10th perſecution ends by an edict of Conſtantine, who profeſſes and eſtabliſhes the Chriſtian religion. In his reign cardinals begin.

314 Three biſhops, ſent from Britain to the council of Arles.

315 Crucifixion aboliſhed.

321 Obſervation of Sunday enjoined.

325 The firſt general council at Nice, wherein 318 fathers attended, againſt Arius, and compoſed the famous Nicene Creed.

328 Conſtantine removes the ſeat of empire to Conſtantinople.

330 A dreadful perſecution of the Chriſtians in Perſia, which laſts 40 years.

331 Conſtantine orders all the heathen temples to be deſtroyed.

334 300,000 Samaritans revolted from their maſters.

341 The Goſpel propagated in Ethiopia by Frumentius.

344 Neocæſarea ruined by an earthquake.

351 The heathens firſt called Pagans.

358 An earthquake deſtroys 150 cities in Aſia and Greece.

360 The firſt monaſtery founded near Poictiers in France, by Martin.

363 Julian, the Apoſtate, endeavours in vain to rebuild the temple of Jeruſalem.

364 The Roman empire divided into the eaſtern and weſtern; each under the government of different emperors.

368 A wall built by the Romans round London, part of which is ſtill viſible.

373 The Bible tranſlated into the Gothic language.

376 The Goths ſettled in Thrace.

379 The cycle of Theophilus commenced.

390 A fiery column ſeen in the air for 30 days.

400 Bells invented by Bp. Paulinus, of Campagnia.

401 Europe over-run by the Goths under Alaric.

404 Another irruption of the Goths. The kingdom of Caledonia or Scotland revives under Fergus II.

406 Third irruption of the Goths. The Vandals, Alans, and Suevi, ſpread into France and Spain, by a conceſſion of Honorius.

408 The Chriſtian religion propagated in Perſia.

409 Rome taken and plundered by the Goths, Auguſt 24.

412 The Vandals begin their kingdom in Spain.

413 The kingdom of Burgundy begun in Alſace.

414 The kingdom of Thoulouſe founded by the Viſigoths.

417 The Alans extirpated by the Goths.

419 Many cities in Paleſtine deſtroyed by an earthquake.

420 The kingdom of France begins upon the Lower Rhine, under Pharamond.

421 The Salique law promulgated.

426 The Romans, reduced to extremities at home, withdraw their troops from Britain.

432 The goſpel preached in Ireland by St Patrick.

444 Europe ravaged by the Huns.

446 The Britons, greatly haraſſed by the Scots and Picts, complain to the Romans, but receive no aſſiſtance.

447 Attila and his Huns ravage the Roman empire.

449 Vortigern, king of the S. Britons, invites the Saxons into Britain, againſt the Scots and Picts.

452 The city of Venice founded.

455 The Saxons, having repulſed the Scots and Picts, eſtabliſh themſelves in Kent, under Hengiſt.

476 The weſtern empire ended under Auguſtulus. Upon its ruins ſeveral new ſtates ariſe in Italy and elſewhere, conſiſting of Goths, Vandals. Huns, and other barbarians, who extinguiſh literature, and deſtroy the works of the learned.

480 A at earthquake at Conſtantinople, which laſted 40 days.

493 Italy reduced by Theodoric king of the Goths.
496 Clovis, king of France, baptized, and Chriſtianity eſtabliſhed.
506 The Jewiſh Talmud publiſhed.
508 Arthur reigns in Britain.
510 Paris made the capital of France.
515 Conſtantinople beſieged by Vitalianus, whoſe fleet is burnt by a ſpeculum of braſs made by Proclus.
516 The computation of time by the Chriſtian era introduced by Dionyſius.
517 Five years drought and famine in Paleſtine.
519 A bearded comet appears.
529 The codex of Juſtinian, publiſhed.
534 The kingdom of the Vandals in Africa ends, after continuing 105 years.
536 The manufacture of ſilk introduced at Conſtantinople by two Indian monks.
540 Antioch deſtroyed by the Perſians.
541 Baſilius the laſt conſul elected at Rome.
542 Antioch rebuilt.
543 An earthquake all over the world.
550 An earthquake in Paleſtine and Syria. The kingdom of Poland founded.
551 An earthquake in Greece, attended with a great commotion in the ſea. Silk manufactures introduced into Europe.
553 The empire of the Goths in Italy overturned by Narſes. A great earthquake at Conſtantinople.
557 Another at Conſtantinople, Rome, &c. A terrible plague all over Europe, Aſia, and Africa, which continues near 50 years.
568 The Lombards found a kingdom in Italy.
569 The Turks firſt mentioned in hiſtory. The exarchate of Ravenna begins.
575 Monarchy founded in Bavaria.
580 Antioch deſtroyed by an earthquake.
581 Latin ceaſed to be ſpoken in Italy.
584 The origin of fiefs in France.
588 Paris deſtroyed by fire.
589 Rome overflowed by the Tiber.
593 The Gaſcons ſettled in Gaſcony.
596 John of Conſtantinople aſſumes the title of univerſal biſhop.
597 Auguſtin comes into England with 40 other monks.
599 A dreadful peſtilence in Africa.
604 St Paul's church in London founded.
605 The uſe of bells introduced into churches.
606 The conceſſions of Phocas, emperor of the Eaſt, give riſe to the papal power.
622 Mahomet, the falſe prophet, flies from Mecca to Medina, in Arabia, and lays the foundation of the Saracen empire. His followers compute from this era, called *hegira*, i. e. the Flight.
628 An academy founded at Canterbury.
632 The era of Jeſdegird commenced June 16th.
637 Jeruſalem taken by the Saracens.
641 Alexandria in Egypt taken by them, and the grand library burnt by Omar their caliph.
643 The Temple of Jeruſalem converted into a Mahometan moſque.
653 The Saracens extend their conqueſts on every ſide, and retaliate the barbarities of the Goths and Vandals upon their poſterity. They take Rhodes, and deſtroy the famous Coloſſus. The Danes invade England.
660 Organs firſt uſed in churches.
663 Glaſs invented by a biſhop, and brought into England by a Benedictine monk.
669 Sicily invaded, and Syracuſe deſtroyed by the Saracens.
685 The Britons, after a brave ſtruggle of near 150 years, are totally expelled by the Saxons, and driven into Wales and Cornwall.
698 The Saracens take Carthage, and expel the Romans from Africa.
700 Cracow built, and the firſt prince of Poland elected.
704 The firſt province given to the Pope.
713 The Saracens conquer Spain.
714 France governed by Charles Martel.
718 The kingdom of the Aſturias in Spain founded by Pelagio.
719 Chriſtianity promulgated in Germany.
726 The controverſy about images begins, and occaſions many inſurrections in the eaſtern empire.
727 Tax of Peter's pence begun by Ina king of Weſſex.
732 Charles Martel defeats the Saracens near Tours.
735 The office of Pope's Nuncio inſtituted.
746 Three years peſtilence in Europe and Aſia.
748 The Chriſtian era uſed in hiſtory.
749 The race of Abbas become caliphs of the Saracens, and encourage learning. The empire of the Saracens divided into three.
752 The exarchate of Ravenna aboliſhed by Aſtulphus king of the Lombards.
755 Commencement of the Pope's temporal dominion.
762 Bagdad made the capital of the caliphs of the houſe of Abbas.
762 Burials, which formerly uſed to be in high ways, permitted in towns.
792 An academy founded in Paris.
794 The Huns extirpated by Charlemagne.
797 Seventeen days of unuſual darkneſs.
800 Charlemagne, king of France, begins the empire of Germany, gives the preſent names to the winds and months, and endeavours to reſtore learning in Europe, then ſolely engroſſed in military enterprizes.
801 A great earthquake in France, Germany, and Italy.
807 Jan. 31. Jupiter eclipſed by the moon. March 17. A large ſpot ſeen in the ſun for 8 days.
808 The firſt deſcent of the Normans on France.
825 The obliquity of the ecliptic obſerved by Benimula to be 23° 55′.
826 Harold, king of Denmark, dethroned by his ſubjects, for being a Chriſtian. The kingdoms of Navarre and Arragon founded.
832 Painters baniſhed out of the eaſtern empire.
836 The Flemings trade to Scotland for fiſh.
840 The Scots and Picts have a deciſive battle, in which the former prevail, and both kingdoms are united under Kenneth II.
842 Germany ſeparated from the empire of the Franks.
856 An earthquake over the greateſt part of the known world.

861 Ruric the firſt prince of Ruſſia began to reign.
864 The Danes begin their ravages in England.
867 Chriſtianity propagated in Bulgaria.
868 Egypt become independent on the caliphs of Bagdad.
872 Bells and clocks firſt uſed in Conſtantinople.
873 France diſtreſſed by locuſts and peſtilence.
874 Iceland peopled by the Norwegians. Scotland invaded by the Danes.
875 A bearded comet appears in France.
878 Alfred the Great, after ſubduing the Daniſh invaders, (againſt whom he fought 56 battles,) compoſes his body of laws, and divides England into counties, hundreds, and tythings.
880 The obliquity of the ecliptic obſerved by Albategni to be 23° 35′.
886 Alfred founds the Univerſity of Oxford.
889 The Hungarians ſettled near the Danube.
890 Alfred erects county courts.
891 The firſt land tax in England.
895 The monaſtery of Cluny founded.
903 A very remarkable comet appeared in China. Rome taken by the Normans.
911 The obliquity of the ecliptic obſerved by Thebit to be 23° 33′ 30″.
912 The Normans eſtabliſh themſelves in Normandy.
915 The univerſity of Cambridge founded.
923 Fiefs eſtabliſhed in France.
925 Sigefroi elected firſt marquis of Brandenburg.
928 The marquiſate of Miſnia eſtabliſhed.
937 The Saracen empire is divided into 7 kingdoms.
94[illegible] Arithmetic brought into Europe.
961 Candia recovered from the Saracens.
967 Antioch recovered from them.
969 The race of Abbas extinguiſhed in Egypt.
673 Pope Boniface VII. depoſed and baniſhed for his crimes.
977 Greece, Macedon, and Thrace, ravaged by the Bulgarians for ten years. The Bohemians ſubdued by Otho I.
979 Coronation oath firſt uſed, and Juries firſt inſtituted in England.
985 The Danes under Sueno invade England and Scotland.
987 The Carlovingian race in France ended, and the Capetian begun by Hugh Capet.
991 The figures now uſed in arithmetic, brought into Europe by the Saracens from Arabia.
993 A great eruption of Mount Veſuvius.
995 England invaded by the Danes and Norwegians.
996 Otho III. makes the German empire elective.
999 Boleſlaus, the firſt king of Poland. The obliquity of the ecliptic obſerved by Aboul-Waſi and Abu Hamed to be 23° 35′.
1000 Paper made of cotton rags.
1002 The emperor Henry aſſumed the title of king of the Romans.
1005 All the old churches are rebuilt about this time in a new manner of architecture.
1006 A plague in Europe for 3 years.
1007 A great eruption of Veſuvius. The obliquity of the ecliptic obſerved by Albatrunius to be 23° 35′.
1014 Sueno the Dane becomes maſter of England, Sept. 28. Almoſt all Flanders laid under water by a ſtorm.
1015 Children forbidden by law to be ſold by their parents in England.
1017 Rain of the colour of blood for 3 days in Aquitain.
1022 A new ſpecies of muſic invented by Aretin.
1035 Togrul-Beg, or Tangrolipix, the Turkiſh ſultan, eſtabliſhes himſelf in Koraſan. The kingdoms of Caſtile and Arragon began.
1036 Canute the Great conquers England.
1040 The Danes, after ſeveral engagements with various ſucceſs, driven out of Scotland. Smyrna deſtroyed by an earthquake.
1041 The Saxon line reſtored under Edward the Confeſſor.
1043 The Turks become formidable and take poſſeſſion of Perſia. The Ruſſians come from Scythia, and land in Thrace.
1054 Leo IX. the firſt pope that kept up an army.
1055 The Turks take Bagdad, and overturn the empire of the Saracens.
1057 Malcolm III. king of Scotland kills the tyrant Macbeth at Dunſinnan, and marries princeſs Margaret, ſiſter to Edgar Atheling.
1061 Surnames appointed to be taken in Scotland, by a parliament held in Forfar.
1065 The Turks take Jeruſalem from the Saracens.
1066 The conqueſt of England by William the Baſtard, duke of Normandy, in the battle of Haſtings, where Harold was ſlain.
1070 The feudal law introduced into England.
1074 Aſia Minor, being now under the power of Solyman, is from this time called Turkey.
1075 Henry IV. emperor of Germany, and the pope, quarrel about the nomination of the German biſhops. Henry, in penance, walks barefooted to the pope near the end of January.
1076 Juſtices of the peace firſt appointed in England. An earthquake in England.
1080 Doomſday book began to be compiled by order of William, from a ſurvey of all the eſtates in England, and finiſhed in 1086. He builds the Tower of London to curb his Engliſh ſubjects; many of whom fly to Scotland, where they introduce the Engliſh language, are protected by Malcolm, and receive lands.
1086 The order of Carthuſians eſtabliſhed by Bruno.
1090 The dynaſty of Bathineens or Aſſaſſins begins in Irak, and continues for 117 years.
1091 The Saracens in Spain, being hard preſſed by the Spaniards, call to their aſſiſtance Joſeph king of Morocco; by which the Moors get poſſeſſion of all the Saracen dominions in Spain.
1096 The firſt cruſade to the Holy Land, to drive the infidels from Jeruſalem.
1098 The order of St Benedict inſtituted.
1099 Jeruſalem taken by the cruſaders; Godfrey elected king; and the order of knights of St John inſtituted.
1110 Edgar Atheling, the laſt of the Saxon princes, dies in England, where he had been permitted

permitted to reſide as a ſubject. Learning revived at Cambridge. Writing on paper made of cotton becomes common.

1119 Bohemia erected into a kingdom.

1132 The kingdom of Portugal began.

1137 The pandects of Juſtinian found in the ruins of Amalphi.

1141 The Guelphs and the Gibelines fill Italy with carnage.

1143 The Koran tranſlated into Latin.

1144 The Peripatetic philoſophy introduced into Germany.

1151 The canon law collected by Gratian, a monk of Bologna.

1154 Chriſtianity introduced into Finland.

1156 The city of Moſcow founded.

1160 The order of Carmelites inſtituted.

1163 London bridge, conſiſting of 19 ſmall arches, firſt built of ſtone.

1164 The Teutonic order of religious knights begins in Germany.

1170 Paper firſt made of linen rags.

1171 The dynaſty of Fatemites ended in Egypt, and the ſovereigns henceforth called Sultans.

1172 Henry II. king of England, takes poſſeſſion of Ireland.

1176 England divided into ſix circuits, and juſtice diſpenſed by itinerant judges.

1179 The univerſity of Padua founded.

1180 Glaſs windows began to be uſed in private houſes in England.

1181 The laws of England digeſted by Glanville.

1182 Pope Alexander III. compelled the kings of England and France to hold the ſtirrups, while he mounted his horſe.

1183 The inhabitants of Berry maſſacre 7000 Albigenſes.

1186 A conjunction of all the planets at ſunriſe September 16. The Sun in 30° ♍; Jupiter in 2° 3′ ♎; Venus in 3° 49′; Saturn in 8° 6′; Mercury in 4° 10′; Mars, 9° 8′; tail of the Dragon, 18° 13′ ♎.

1187 Jeruſalem taken by Saladin.

1192 The battle of Aſcalon, in which Richard I. king of England, defeats Saladin's army, of 300,000 men.

1194 *Dieu et mon Droit*, firſt uſed as a motto by Richard I. on a victory over the French.

1195 Denmark and Norway laid waſte by a dreadful tempeſt.

1198 Order of the Holy Trinity inſtituted.

1200 Chimnies not known in England. Surnames began to be uſed. Univerſity of Salamanca in Spain founded.

1204 Conſtantinople taken by the French and Venetians. The Inquiſition eſtabliſhed. The empire of Trebizond erected.

1208 London incorporated by king John. The order of *Fratres Minores* eſtabliſhed. King John excommunicated by the pope.

1209 The works of Ariſtotle imported from Conſtantinople into Europe. The ſilk manufacture imported from Greece into Venice.

1210 The works of Ariſtotle burnt at Paris. The emperor Otho IV. excommunicated by the pope. Violent perſecution of the Albigenſes.

1215 Magna Charta ſigned by king John and the barons of England. Court of common pleas eſtabliſhed. Orders of the Dominicans and Knights Hoſpitallers founded. Tranſubſtantiation introduced.

1216 K. Alexander II. and the whole kingdom of Scotland, excommuuicated by the pope's legate.

1220 Aſtronomy and geography brought into Europe by the Moors.

1223 A great earthquake in Germany.

1225 A comet of extraordinary magnitude ſeen in Denmark.

1226 A league formed againſt the Albigenſes by the French king and many prelates and lords.

1227 The Tartars, under Jenghiz Khan, over-run all the Saracen empire, and carry death and deſolation wherever they march.

1228 The univerſity of Thoulouſe founded.

1230 Denmark diſtreſſed by peſtilence. The kingdoms of Leon and Caſtile united. Pruſſia ſubdued by the Teutonic knights. Univerſity of Naples founded.

1231 The Almageſt of Ptolemy tranſlated into Latin.

1233 The houſes of London, and other cities in England, France, and Germany, ſtill thatched with ſtraw.

1238 The univerſity of Vienna founded.

1239 A writing of this year's date on paper made of rags ſtill extant.

1241 The Hanſeatic league formed. Tin mines diſcovered in Germany.

1245 A clear red ſtar, like Mars, appears in Capricorn.

1250 Painting revived in Florence by Cimabue.

1251 Wales ſubdued, and Magna Charta confirmed.

1253 The famous aſtronomical tables compoſed by Alphonſo X. king of Caſtile.

1256 The order of Auguſtines eſtabliſhed.

1258 The Tartars take Bagdad, which ends the empire of the Saracens.

1260 The ſect of Flagellantes appear in Italy.

1263 Acho king of Norway invades Scotland with 160 ſail, and lands 20,000 men at the mouth of the Clyde; but they are cut to pieces by Alexander III. who recovers the weſtern iſles.

1264 The commons of England firſt ſummoned to parliament about this time.

1268 The Tartars invade China.

1269 The Hamburgh company incorporated in England. The obliquity of the ecliptic obſerved by Cozah Naſirodni to be 23° 30′.

1272 The Academy of Florence founded.

1273 The empire of the houſe of Auſtria begins in Germany. The obliquity of the ecliptic obſerved by Cheou-king in China to be 23° 33′ 39″.

1274 The firſt commercial treaty betwixt England and Flanders.

1279 King Edward I. renounced his right to

Normandy. The mortmain act paſſed in England.

1282 Lewellyn, prince of Wales, defeated and killed by Edward I. and Wales united to England. A great peſtilence in Denmark 8000 French murdered at the Sicilian veſpers. Academy de la Cruſca founded.

1284 Edward II. the firſt Engliſh prince of Wales, born at Caernarvon.

1285 Alexander III. king of Scotland, dies: the ſucceſſion diſputed by 12 candidates, who ſubmit their claims to the arbitration of Edward I. which lays the foundation of a long and deſolating war between Scotland and England.

1290 The Univerſity of Liſbon founded.

1291 Ptolemais taken by the Turks. End of the cruſades.

1293 From this year, being the 22d of Edward I. parliaments were regularly held in England.

1294 Parliaments eſtabliſhed in Paris.

1296 Sir William Wallace, one of the greateſt and moſt diſintereſted patriots, that any age or country ever produced, aſſerts the independency of Scotland, and performs extraordinary feats of heroiſm againſt the Engliſh.

1297 The Engliſh army defeated by Wallace at Stirling. The Scots invade England.

1298 The Turkiſh empire begins in Bithynia under Ottoman. Silver-hafted knives, ſpoons, and cups, reckoned great luxuries, as well as tallow candles; ſplinters of wood having been hitherto uſed for lights. Wine ſold by apothecaries as a cordial. The Scots defeated by the Engliſh at Falkirk.

1299 An earthquake in Germany. Spectacles invented by a monk of Piſa. The year of jubilee inſtituted by Boniface VIII.

1302 The mariner's compaſs invented, or improved, by Giovia, of Naples. The univerſity of Avignon founded.

1304 Sir William Wallace betrayed by Menteith, and barbarouſly murdered by Edward I.

1307 William Tell, the illuſtrious Swiſs patriot, delivers his country from the German yoke, and gives riſe to the republic of Switzerland. Coals firſt uſed in England.

1308 The popes remove to Avignon in France for 70 years.

1310 Lincoln's inn ſociety eſtabliſhed. The knights of St John take poſſeſſion of the iſle of Rhodes.

1314 The battle of Bannockburn, between Edward II. and Robert Bruce, which eſtabliſhes the latter on the throne of Scotland. The cardinals ſet fire to the conclave, and ſeparate. A vacancy in the papal chair for two years.

1315 Germany afflicted with famine and peſtilence.

1319 The univerſity of Dublin founded.

1320 Gold firſt coined in Europe. An earthquake in England.

1323 A great eruption of Mount Ætna.

1325 The firſt treaty of commerce between England and Venice.

1330 Gunpowder invented by a monk of Cologne.

1332 The pope accuſed of hereſy.

1336 Two Brabant weavers ſettle at York.

1337 The firſt comet whoſe courſe is deſcribed with aſtronomical exactneſs. Europe infeſted by locuſts.

1340 Heralds college inſtituted in England. Copper money firſt uſed in Scotland and Ireland.

1344 Edward III. firſt grants titles by patents. Gold firſt coined in Britain.

1345 Edward III with 4 pieces of cannon, gains the battle of Creſſy.

1347 David II. king of Scots, taken priſoner at the battle of Durham.

1349 The order of the Garter inſtituted.

1352 The Turks firſt enter Europe.

1353 Aſia and Africa deſolated by locuſts.

1354 The money in Scotland reduced, which till this period had been the ſame as in England.

1356 The battle of Poictiers, in which king John of France and his ſon were taken priſoners by Edward the Black prince.

1357 Coals firſt brought to London.

1358 Arms of England and France quartered by Edward III. Univerſity of Cologne founded. Tamerlane began to reign in Perſia.

1362 The law pleadings in England changed from French to Engliſh. The order of Janizaries eſtabliſhed among the Turks.

1365 The univerſities of Vienna and Geneva founded.

1369 John Wickliffe, an Engliſhman, oppoſes the errors of the church of Rome.

1370 The office of grand vizir eſtabliſhed.

1377 Inundation of the ſea in Flanders.

1378 Greenland diſcovered by a Venetian.

1381 Bills of Exchange firſt uſed in England.

1384 The firſt act of navigation in England, prohibiting goods to be exported or imported in foreign bottoms.

1386 A company of linen weavers from the Netherlands eſtabliſhed in London. Windſor caſtle built by Edward III.

1387 The office of Lord High Admiral of England inſtituted.

1388 The battle of Otterburn between earl Piercy and the earl of Douglas. Bombs invented at Venloo.

1391 Cards invented in France.

1399 Weſtminſter Abbey and Hall rebuilt and enlarged. Order of the bath inſtituted.

1402 Tamerlane defeats and takes priſoner Bajazet.

1405 The Canary iſlands diſcovered by Bethencourt.

1410 Guildhall of London built. Painting in oil colours invented by Van-dyck.

1411 The univerſity of St Andrew's in Scotland founded.

1412 Algebra brought from Arabia into Europe.

1415 The battle of Agincourt gained over the French by Henry V. of England.

1420 Madeira diſcovered by the Portugueſe.

1421 The revenue of England amounted to L. 55,754.

1428 The ſiege of Orleans.

1429 The French, encouraged by the heroic Joan of Arc; compel the Engliſh to raiſe the ſiege of Orleans, and take Jergeau. Charles VII. crowned at Rheims.

1430 Henry VI. of England, crowned at Paris.

1431 Joan the patriotic maid of Orleans, taken by the D. of Bedford, and barbarouſly burned for a witch. A great earthquake at Liſbon.

1432 Great inundations in Germany.

1437 The obliquity of the ecliptic obſerved by Ulug Beg to be 23° 30′ 17″.

1440 Printing by wooden blocks invented by Lawrentius, at Haarlem in Holland.

1446 The Vatican library founded at Rome. The ſea breaks in at Dort in Holland, and drowns 100,000 people.

1450 The Bible printed at Mentz, by John Fauſtus and Co. with cut metal types.

1453 Conſtantinople taken by the Turks, which ends the eaſtern empire, 1123 years from its dedication by Conſtantine the Great, and 2206 from the foundation of Rome.

1454 The univerſity of Glaſgow in Scotland founded.

1457 Glaſs firſt manufactured in England.

1459 Printing completed by Schoeffer's invention of caſt metal types.

1460 Engraving and etching on copper invented. The obliquity of the ecliptic obſerved by Purbachius and Regiomontanus to be 23° 29′.

1468 Printing firſt performed in England at Oxford.

1471 William Caxton firſt erects a printing preſs in Weſtminſter Abbey.

1473 The ſtudy of the Greek language introduced into France.

1477 The univerſity of Aberdeen in Scotland founded.

1479 Union of the kingdoms of Arragon and Caſtile.

1482 The coaſt of Guinea diſcovered by the Portugueſe. A court of Inquiſition erected in Seville.

1483 Richard III. of England defeated and killed at the battle of Boſworth, by Henry VII.

1486 Henry eſtabliſhes 50 yeomen of the guards, the firſt ſtanding army.

1489 Maps and ſea charts firſt brought to England by Barth. Columbus.

1490 William Groceyn introduces the ſtudy of the Greek language into England. The Moors entirely ſubdued by Ferdinand V. of Spain, and become his ſubjects.

1492 America diſcovered by Columbus. The Moors expelled from Granada, which they had poſſeſſed for upwards of 800 years.

1495 The venereal diſeaſe introduced into Europe.

1496 The Jews and Moors baniſhed out of Portugal.

1497 The Portugueſe firſt ſail to the Eaſt Indies by the Cape of Good Hope. South America diſcovered by Americus Veſputius. North America diſcovered by Cabot, employed by Henry VII.

1500 Maximilian divides the empire of Germany into ſix circles. Brazil diſcovered by the Portugueſe. Florida diſcovered by John Cabot, an Engliſhman. Painting in chiaro obſcuro diſcovered. A great plague in England.

1505 Shillings firſt coined in England.

1507 The Portugueſe diſcover Madagaſcar.

1509 Gardening introduced into England from the Netherlands, from whence vegetables had been imported hitherto.

1510 The obliquity of the ecliptic obſerved by Werneus to be 23° 28′ 30″.

1512 Maximilian adds 4 more circles to the German empire.

1513 The battle of Flowden, in which James IV. king of Scotland is killed, with the flower of his nobility.

1514 Cannon bullets of ſtone ſtill uſed.

1515 The firſt Polyglot Bible printed at Alcala. Navarre annexed to Caſtile by Ferdinand.

1516 Algiers ſeized by Barbaroſſa.

1517 Martin Luther began the Reformation. Egypt conquered, and the kingdom of the Mamalukes overthrown by the Turks.

1518 New Spain, and the Straits of Magellan diſcovered.

1521 Henry VIII. for his writings in favour of Popery, receives the title of *Defender of the Faith* from his Holineſs.

1522 Rhodes taken by the Turks. The firſt voyage round the world performed by a ſhip of Magellan's ſquadron.

1526 The inquiſition eſtabliſhed in Portugal. Lutheraniſm eſtabliſhed in Germany.

1527 Rome taken and plundered by the Imperial army.

1528 Popery aboliſhed in Sweden.

1529 The name of Proteſtant takes its riſe from the reformed proteſting againſt the church of Rome, at the diet of Spires in Germany.

1530 Union of the Proteſtants at Smallcalde, December 22d. Secretary of State eſtabliſhed in England.

1531 A great earthquake at Liſbon.

1532 The Court of Seſſion inſtituted in Scotland.

1533 Inſurrection of the Anabaptiſts in Weſtphalia.

1534 The Reformation takes place in England, under Henry VIII. Silk firſt worn by the clergy. Barbaroſſa ſeized the kingdom of Tunis.

1535 The Reformation introduced into Ireland. The ſociety of Jeſuits formed.

1539 The firſt Engliſh edition of the Bible authoriſed. Cannon began to be uſed in ſhips: 645 religious houſes ſuppreſſed in England and Wales.

1540 The variation of the compaſs diſcovered by Sebaſtian Cabot. The obliquity of the ecliptic obſerved by Copernicus to be 30° 28′ 8″. Society of the Jeſuits eſtabliſhed, September 27.

1543 Silk ſtockings firſt worn by the French king. Pins firſt uſed in England, before which time the ladies uſed wooden ſkewers. Iron cannon and mortars made in England.

1544 Good lands let in England at one ſhilling per acre.

1545 The council of Trent begins, and continues 18 years.

1547 The intereſt of money fixed by law at 10 *per cent.* in England.

1548 The reformation gained ground in Poland.

1549 Lord lieutenants of counties inſtituted in England.

1550 Horſe guards inſtituted in England. The bank of Venice eſtabliſhed.

1552 Books of geography and aſtronomy deſtroyed in England, as being infected with magic. The book of Common Prayer eſtabliſhed in England by act of Parliament.

1553 Servetus, a French phyſician, firſt broaches the circulation of the blood.

1554 Aſtracan conquered by the Ruſſians.

1555 The Ruſſian company eſtabliſhed in England.

1558 Q. Elizabeth begins her reign.

1560 The Reformation in Scotland completed by John Knox.

1561 Livonia ceded to Poland. Silk ſtockings firſt worn in England by Q. Elizabeth.

1563 Knives firſt made in England.

1565 Revolt of the Low Countries. Malta attacked by the Turks.

1566 The 39 articles of the church of England eſtabliſhed. Lord Darnley murdered.

1568 Mary Q. of Scots impriſoned in England. Liberty of exerciſing the reformed religion granted to the Low Countries.

1569 Royal Exchange firſt built.

1571 The iſland of Cyprus taken by the Turks. They are defeated at Lepanto.

1572 The dreadful maſſacre of Proteſtants at Paris. A new ſtar in Caſſiopæia obſerved by Cornelius Gemma. It appeared in November, and diſappeared in March.

1576 The exerciſe of the Proteſtant religion authoriſed in France. This toleration followed by a civil war.

1578 The firſt treaty of alliance betwixt England and the States General, January 7th.

1579 The Dutch ſhake off the Spaniſh yoke, and the republic of Holland begins. Engliſh Eaſt India company incorporated. Turkey company incorporated.

1580 Sir Francis Drake returns from his voyage round the world. Parochial regiſters firſt appointed in England. The kingdom of Portugal ſeized by Philip II. of Spain.

1581 Copper money firſt uſed in France.

1582 Pope Gregory XIII. introduces the New Stile in Italy.

1583 Tobacco firſt brought from Virginia into England. The firſt propoſal of ſettling a colony in America.

1587 Mary queen of Scots beheaded by order of Elizabeth, after 18 years impriſonment.

1588 The Spaniſh Armada deſtroyed by Drake and other Engliſh admirals. Paper firſt made in England, at Deptford. Duelling with ſmall ſwords introduced into England.

1589 The ſteel frame for weaving ſilk ſtockings invented by the rev. Mr Lee of Cambridge. Coaches firſt introduced into England. Henry of Bourbon, king of Navarre, ſucceeds Charles IX. of France.

1590 Band of penſioners inſtituted in England. Teleſcopes invented by Janſen, a ſpectacle-maker in Germany.

1591 Trinity college, Dublin, founded.

1593 A great plague in London.

1594 The Jeſuits expelled from France. The obliquity of the ecliptic obſerved by Byrgius to be 23° 30′.

1595 The ſame obſerved by Tycho Brahe to be 23° 29′ 25″.

1596 A great earthquake at Japan.

1597 Watches firſt brought into England from Germany.

1598 The edict of Nantes paſſed by Henry IV. of France, tolerating the Proteſtants.

1600 Engliſh E. India Company eſtabliſhed.

1602 Decimal arithmetic invented at Bruges.

1603 Q. Elizabeth dies, and is ſucceeded by James VI. of Scotland. The two kingdoms united under the name of Great Britain.

1605 The Gunpowder plot, to blow up the king and parliament, diſcovered.

1606 Chriſtian IV. king of Denmark viſits king James. Oaths of allegiance firſt adminiſtered in England.

1608 Colonies ſent from England to Virginia.

1609 The independency of the United Provinces acknowledged by Spain. A million of Moors driven from Spain to Africa, by the barbarity of the Inquiſition.

1610 Galileo firſt diſcovers four ſatellites about Jupiter. Henry IV. murdered at Paris by Ravaillac, a prieſt. Thermometers invented by Diebel a Dutchman.

1611 Baronets firſt created in England by James I. May 22. The tranſlation of the Bible, which is ſtill uſed, completed. An earthquake at Conſtantinople, where 200,000 perſons died of the plague.

1612 The north-weſt paſſage to China attempted in vain by the Engliſh.

1614 Napier of Merchiſton, in Scotland, invents the logarithms. Sir Hugh Middleton brings the new river to London from Ware. The king of Denmark viſits king James the 2d time.

1616 The firſt permanent ſettlement in Virginia.

1617 K. James viſits Scotland.

1618 Sir Walter Rawleigh beheaded. A comet appears, Nov. 18.

1619 Dr W. Harvey completes the diſcovery of the circulation of the blood.

1620 The broad ſilk manufactures from raw ſilk, introduced into England. Barbadoes diſcovered by Sir Wm. Courteen. Navarre united to France. Copper money firſt introduced into England.

1621 New England planted by the Puritans. The two parties of Whigs and Tories formed in England.

1622 The Palatinate reduced by the Imperialiſts.

1623 The knights of Nova Scotia inſtituted.

1624 Maſſacre of the Engliſh at Amboyna.

1625 K. James dies, and is ſucceeded by Charles I. The iſland of Barbadoes, the firſt Engliſh ſettlement in the W. Indies, is planted.

1631 The tranſit of Mercury over the ſun's diſk, firſt obſerved by Gaſſendi. A great eruption of Veſuvius.

1632 The battle of Lutzen, in which Guſtavus Adolphus, king of Sweden, and head of the Proteſtants in Germany, is killed.

1633 Galileo condemned by the Inquiſition at Rome. Louiſiana diſcovered by the Fr. K. Charles I. crowned at Edinburgh.

1635 Province of Maryland planted by Lord Baltimore. Regular poſts eſtabliſhed from London to Scotland, Ireland, &c.

1636 A tranſit of Mercury over the ſun's diſk, obſerved by Caſſini.

1637 Meſſ. Pryn, Burton, and Baſtwick, pilloried. The king endeavours to eſtabliſh epiſcopacy in Scotland. The Scots enter into a ſolemn league and covenant.

1638 The E. of Argyle joins the covenanters.

1639 A tranſit of Venus over the ſun's diſk, firſt obſerved by Mr Horrox, Nov. 24th O. S. 3 h. 15′ P. M.

1640 The Scottiſh army, under Gen. Leſley, enters England, and takes Newcaſtle. The maſſacre in Ireland, when 40,000 Proteſtants were killed. The independency of Portugal recovered by John duke of Braganza. The long Parliament begins in England.

1641 Earl of Strafford beheaded. The Iriſh rebellion breaks out.

1642 K. Charles impeaches five refractory members, which begins the civil wars in England.

1643 Exciſe on beer, ale, &c. firſt impoſed by parliament. Barometers invented by Torricelli.

1644 Sir T. Fairfax voted General by the Engliſh Parliament.

1645 Abp. Laud beheaded.

1648 A new ſtar obſerved in the tail of the Whale by Fabricius.

1649 Charles I. beheaded at Whitehall, aged 49. Pendulums firſt applied to clocks by Huygens.

1650 The Marq. of Montroſe defeated, and beheaded. Charles II. crowned at Scoon.

1651 The ſect called *Quakers* appeared in England.

1652 The Dutch colony at the Cape of Good Hope eſtabliſhed.

1653 Sea fight between the Engliſh and the Dutch fleets. The latter defeated, and their admiral, Van Trump, killed.

1654 Cromwell aſſumes the protectorſhip. The air pump invented by Otto Guericke of Magdeburg.

1655 The Engliſh under Admiral Penn, take Jamaica from the Spaniards. One of Saturn's ſatellites obſerved by Huygens.

1657 Cromwell refuſes the title of king.

1658 Cromwell dies, and is ſucceeded in the protectorſhip by his ſon Richard.

1660 King Charles II. reſtored by Monk, after an exile of 12 years in France and Holland. The people of Denmark, being oppreſſed by the nobles, ſurrender their privileges to Frederick III. who becomes abſolute.

1661 The obliquity of the ecliptic obſerved by Hevelius to be 23° 29′ 7″.

1662 The Royal Society eſtabliſhed at London by Charles II.

1663 Carolina coloniſed. Pruſſia declared independent of Poland.

1664 The New Netherlands, in North America, conquered from the Swedes and Dutch by the Engliſh.

1665 The plague rages in London, and carries off 68,000 perſons. The magic lantern invented by Kircher.

1666 The great fire of London began Sept. 2. and continued three days, in which were deſtroyed 400 ſtreets, and 13,000 houſes. Tea firſt uſed in England.

1667 The peace of Breda, which confirmed to the Engliſh the New Netherlands, ſince called Pennſylvania, New York, and New Jerſey.

1668 The peace of Aix la Chapelle. St James's Park planted, and made a thorough-fare for public uſe by Charles II.

1669 Candia taken by the Turks.

1670 The Engliſh Hudſon's Bay Company incorporated. The obliquity of the ecliptic obſerved by Mengoli to be 23° 28′ 24″.

1672 Louis XIV. over-runs great part of Holland, when the Dutch opened their ſluices, being determined to drown their country and retire to their ſettlements in the E. Indies. African company eſtabliſhed. The obliquity of the ecliptic obſerved by Richer to be 23° 28′ 52″.

1677 The micrometer invented by Kircher.

1678 The peace of Nimeguen. The habeas corpus act paſſed. An uncommon darkneſs at noon-day, Jan. 12.

1680 A great comet appeared, and from its nearneſs to our earth alarmed the inhabitants. It continued viſible from Nov. 3. to March 9. William Penn, a Quaker, receives a charter for planting Pennſylvania.

1683 India ſtock ſold from 360 to 500 *per cent.*

1685 Charles II. dies, aged 55, and is ſucceeded by his brother James II. The duke of Monmouth raiſes a rebellion, but is defeated at the battle of Sedgmore and beheaded. Lewis XIV. revokes the edict of Nantes. Great numbers of Fr. Proteſtants exiled.

1686 The Newtonian philoſophy publiſhed.

1687 The palace of Verſailles, near Paris, finiſhed.

1688 The Revolution of Great Britain begins Nov. 5. K. James abdicates, and retires to France, Dec. 3. K. William III. and Q. Mary II. proclaimed Feb. 16. Viſcount Dundee ſtands out for James in Scotland, but is killed by Gen. Mackay at the battle of Killycrankie; upon which the Highlanders diſperſe. Smyrna deſtroyed by an earthquake.

1689 The land tax and toleration act paſſed in England. Several biſhops deprived for not taking the oaths to William and Mary. Epiſcopacy aboliſhed in Scotland.

1690 The battle of the Boyne, gained by K. William in Ireland.

1691 The war in Ireland finiſhed, by the ſurrender of Limerick. The obliquity of the ecliptic obſerved by Flamſtead to be 23° 28′ 32″.

1692 The Engliſh and Dutch fleets commanded by Admiral Ruſſel, defeat the French fleet off La Hogue. The maſſacre of Glencoe in Scotland, Jan. 31. O. S. Earthquakes in England and Jamaica, September 8. Hanover made an electorate of the empire.

1693 Bayonets at the end of loaded muſkets firſt uſed by the French againſt the confederates in the battle of Turin. Bank of England eſtabliſhed by K. William. The firſt public lottery drawn.

1694 Queen Mary dies, aged 33, and William reigns alone. Stamp duties inſtituted in England.

1696 The peace of Ryſwick.

1699 The Scots ſettle a colony at the iſthmus of Darien, which is purpoſely ruined by the Engliſh government.

1700 Charles XII. of Sweden begins his reign. King James II. dies at St Germains, aged 68.

1701 Pruſſia erected into a kingdom. Society for the propagation of the goſpel in foreign parts eſtabliſhed.

1702 K. William dies, aged 50, and is ſucceeded by Q. Anne, who, with the Emperor and States General, renews the war againſt France and Spain. The French ſend colonies to the Miſſiſippi.

1703 The obliquity of the ecliptic obſerved by Bianchini to be 23° 28′ 25″.

1704 Gibraltar taken from the Spaniards by Admiral Rooke. The battle of Blenheim gained by the duke of Marlborough and the allies. The court of Exchequer inſtituted in England.

1706 The treaty of union betwixt England and Scotland, ſigned July 22. The battle of Ramillies won by Marlborough and the allies.

1707 The firſt Britiſh parliament. The allies defeated at Almanza.

1708 Minorca taken from the Spaniards by General Stanhope. The battle of Oudenarde won by Marlborough and the allies.

1709 Peter the Great defeats Charles XII. at Pultowa. The battle of Malplaquet won by Marlborough and the allies.

1710 Queen Anne changes the Whig miniſtry for others more favourable to the intereſt of her brother. The cathedral church of St Paul's, London, rebuilt by Sir Chr. Wren in 37 years, at one million expence, raiſed by a duty on coals. The Engliſh South Sea Company began.

1712 Duke of Hamilton and Lord Mahon killed in a duel in Hide Park.

1713 The peace of Utrecht, whereby Newfoundland, Nova Scotia, New Britain, and Hudſon's Bay, in North America, were yielded to Great Britain, and Gibraltar and Minorca, confirmed to it.

1714 Q. Anne died aged 50, and was ſucceeded by K. George I. Intereſt reduced to five per cent.

1715 Lewis XIV. died and was ſucceeded by his great-grandſon Lewis XV. The rebellion in Scotland begins in September under the earl of Mar. The action of Sheriffmuir, and the ſurrender of Preſton, both in Nov. when the rebels diſperſe. The obliquity of the ecliptic obſerved by Louville to be 23° 28′ 24″.

1716 Prince Charles Stewart married the princeſs Sobieſki, grand-daughter of John Sobieſki, king of Poland. Parliaments, hitherto triennial, enacted to be ſeptennial.

1718 Sardinia erected into a kingdom, in favour of the duke of Savoy.

1719 The Miſſiſippi ſcheme at its height in France. Lombe's ſilk-throwing machine, containing 26,586 wheels, erected at Derby: takes up one eighth of a mile; one water wheel moves the reſt; and in 24 hours it works 318,504,960 yards of organzine ſilk thread.

1720 The South Sea ſcheme in England begun April 7, was at its height at the end of June, and quite ſunk September 29. A great earthquake in China.

1724 An earthquake in Denmark.

1725 Order of the Bath renewed.

1727 K. George I. died, aged 68, and was ſucceeded by his only ſon, George II. Inoculation firſt tried on criminals with ſucceſs. Ruſſia, formerly a dukedom, is now eſtabliſhed as an empire. The aberration of the fixed ſtars diſcovered and accounted for by Dr Bradley.

1728 Carolina divided into two provinces.

1732 Kouli Khan uſurps the Perſian throne, conquers the Mogul empire, and returns with 231 millions Sterling. Several public ſpirited gentlemen begin the ſettlement of Georgia in North America.

1733 The Jeſuits expelled from Paraguay.

1736 Capt. Porteous, having ordered his ſoldiers to fire upon the populace at an execution of a ſmuggler, is himſelf hanged by a mob at Edinburgh. A tranſit of Mercury obſerved by Caſſini.

1737 A dreadful hurricane at the mouth of the Ganges, Oct. 10.

1738 Weſtminſter bridge, conſiſting of 15 arches, begun. The order of St Januarius eſtabliſhed at Naples.

1739 Letters of marque iſſued out in Britain againſt Spain, July 21, and war declared, Oct. 23. The empire of Indoſtan ruined by Kouli Khan. An intenſe froſt in Britain.

1743 The battle of Dettingen won by the Britiſh and allies in favour of the queen of Hungary. A dreadful plague in Sicily.

1744 War declared againſt France. Commodore Anſon returns from his voyage round the world.

1745 The allies loſe the battle at Fontenoy. A 2d rebellion breaks out in Scotland. The rebels defeated by the duke of Cumberland at Culloden, April 16, 1746.

1746 Britiſh Linen Company erected. Lima deſtroyed by an earthquake.

1747 Kouli Khan murdered.

1748 The peace of Aix la Chapelle, by which a reſtitution of all places taken during the war was to be made on all ſides.

1749 The intereſt on the Britiſh funds reduced to 3 per cent. Britiſh herring fiſhery incorporated. The colony of Nova Scotia founded.

1750 Earthquake in England. Weſtminſter bridge finiſhed. The expence, L.389,000, defrayed by parliament.

1751 Frederic, prince of Wales, died. Antiquarian ſociety at London incorporated.

1752 The new ſtile introduced into Great Britain; the 3d of Sept. being reckoned the 14th.

1753 The Britiſh muſeum erected at Montague Houſe. Society of arts, manufactures, and commerce, inſtituted in London.

1754 A dreadful eruption of mount Ætna. A great earthquake at Conſtantinople, Cairo, &c. Sept. 2d.

1755 Quito in Peru deſtroyed by an earthquake, April 28th. Liſbon deſtroyed by an earthquake, Nov. 1ſt.

1756 Marine Society eſtabliſhed at London: 146 Engliſhmen confined in the Black Hole at Calcutta: 123 found dead next morning. The king of Pruſſia commences hoſtilities in Saxony, and defeats the Auſtrians at Lo.

1757 Damien attempted to aſſaſſinate the French king. The king of Pruſſia invades Bohemia. Defeats the Auſtrians at Riechenberg, April 21ſt, and at Prague, May 6th. Repulſed by Count Daun at Kolin, June 18th. The allies defeated by the French at Haſtenbeck, July 26th. Convention of Cloſter-Seven, Sept. 8th. The king of Pruſſia defeats the French and Auſtrians at Roſbach, Nov. 5. The Pruſſians defeated Near Breſlaw, Nov. 22d. The Auſtrians defeated at Liſſa, Dec. 5th.

1758 Senegal taken by the Britiſh, May 1ſt; and Louiſbourg, July 27th. The king of Pruſſia defeats the Ruſſians at Zorndorf, Aug. 25th. Is defeated by Count Daun at Hoch-Kirchen, Oct. 14th. Goree taken by Commodore Keppel, Dec. 29th. Attempt to aſſaſſinate the king of Portugal, Dec. 3.

1759 General Wolfe killed in the battle of Quebec, which is gained by the Britiſh. The French defeated by prince Ferdinand at Bergen, April 13th. Guadaloupe taken by the Britiſh, May 1ſt. King of Pruſſia defeated by the Ruſſians at Cunerſdorf, Aug. 12th. The French fleet defeated by Admiral Hawke, Nov. 20th. Balbec and Tripoli deſtroyed by an earthquake, Dec. 5th.

1760 King George II. died Oct. 25th, aged 77, and was ſucceeded by his grandſon, K. George III. Blackfriars bridge, conſiſting of 9 arches, begun; finiſhed in 1770, at the expence of 152,840l. diſcharged by a toll. A tranſit of Venus over the ſun, June 6th. Earthquakes in Syria Oct. 13. The king of Pruſſia defeats the Auſtrians at Torgau, Nov. 3d.

1761 Pondicherry taken by Col. Coote, Jan. 15th. Belleiſle ſurrendered to the Britiſh, Feb. 4th. K. George III. married to princeſs Charlotte of Mecklenburg Strelitz, and both crowned Sept. 22.

1762 War declared againſt Spain. Peter III. emperor of Ruſſia, depoſed, impriſoned, and murdered. American philoſophical ſociety eſtabliſhed in Philadelphia. George Auguſtus Frederic prince of Wales, born Aug. 12th. Martinico ſurrendered to the Britiſh Feb. 4th, and Havannah Aug. 12th. Manilla taken, Oct. 6th.

1763 The definitive treaty of peace between Great Britain, France, Spain, and Portugal, concluded at Paris, Feb. 10th; which confirmed to Great Britain the extenſive provinces of Canada, Eaſt and W. Florida, and part of Louiſiana, in North America; with the iſlands of Granada, St Vincent, Dominica, and Tobago, in the Weſt Indies. The Jeſuits expelled from France.

1764 The parliament granted 10,000l. to Mr Harriſon for his diſcovery of the longitude by his time piece. Famine and peſtilence in Italy. An earthquake at Liſbon.

1765 The Society of Artiſts incorporated by royal charter. The ſovereignty of the iſle of Man annexed to the crown of Great Britain.

1766 April 21ſt, a ſpot more than thrice the bigneſs of our earth, paſſed the ſun's centre. The American ſtamp act repealed March 18th. A great earthquake at Conſtantinople. The Jeſuits expelled from Bohemia and Denmark.

1767 The Jeſuits expelled from Spain, Venice, and Genoa, April 2d. Martinico almoſt deſtroyed by an earthquake. The proteſtants tolerated in Poland, Nov. 2d.

1768 Academy of painting eſtabliſhed in London. The Turks impriſon the Ruſſian ambaſſador, and declare war againſt that empire. The Jeſuits expelled from Naples, Malta, and Parma.

1769 Gen. Paoli fled from Corſica, June 13th. The iſland then reduced by the French.

1770 An earthquake at St Domingo.

1771 Dr Solander and Mr Banks, in his majeſty's ſhip the Endeavour, Lieut. Cook, return from a voyage round the world, having made ſeveral important diſcoveries in the South Seas. An emigration of 500,000 Tourgouths from the coaſts of the Caſpian Sea to the frontiers of China.

1772 The king of Sweden changes the conſtitution from an ariſtocracy to a limited monarchy. Prince Charles Stewart marries a princeſs of Germany, grand-daughter of Thomas late earl of Ayleſbury. The Emperor of Germany, Empreſs of Ruſſia, and the king of Pruſſia, ſtrip the king of Poland of a great part of his dominions, which they divide among themſelves, in violation of the moſt ſolemn treaties.

1773 Captain Phipps ſent to explore the North Pole; but having made 81° is in danger of being locked up by the ice, and his attempt to diſcover a paſſage in that quarter proves fruitleſs. The Engliſh Eaſt India Company having, by conqueſt or treaty, acquired the extenſive provinces of Bengal, Orixa, and Bahar, containing 15 millions of inhabitants, great irregularities are committed by their ſervants abroad; upon which government interferes, and ſends out judges, &c. for the better adminiſtration of juſtice. The war between the Ruſſians and the Turks proves diſgraceful to the latter, who loſe the iſlands of the Archipelago, and are every where unſucceſsful at ſea. The ſociety of Jeſuits ſuppreſſed by the Pope's bull, Aug. 25th.

1774 Peace proclaimed between the Ruſſians and the Turks. The Britiſh parliament having paſſed an act laying a duty of 3d. per pound upon all teas imported into America, the coloniſts deny the right of the Britiſh parliament to tax them. The American colonies ſend deputies to Philadelphia, who aſſume the title of *The Congreſs of the Thirteen United Provinces*, and all the powers of government.

1775 The American war commences. Action at Bunker's Hill, June 7. The Spaniards land near Algiers, and are defeated, July 8.

1776 The United States of America declare themſelves independent of the crown and parliament of Great Britain. The Americans defeated at Long Iſland, Auguſt 27.

1777 Philadelphia taken by the Britiſh, October 3. General Burgoyne and his army ſurrender to the Americans.

1778 The ſiege of Gibraltar begun by the Spaniards, July 8. An extraordinary eruption of Veſuvius, Auguſt 8.

1779. Captain Cook killed by the natives of the iſlands in the South Seas.

1780 January 14, 6 h. A. M. the thermometer ſuſpended in the open air at Glaſgow, ſtood at 46° below 0. The Spaniſh fleet defeated by Admiral Rodney, January 16. Charleſton ſurrendered to the Britiſh, May 12. A dreadful inſurrection in London, and riots in many other parts of the kingdom. Several Britiſh ſhips taken by the combined fleets of France and Spain. Lord Cornwallis defeats the Americans at Camden. A dreadful hurricane in the Leeward Iſlands, October 9. An extraordinary ſtorm of wind in England. War declared againſt the Dutch, Dec. 20.

1781 St Euſtatius taken by Rodney. Lord George Gordon tried for high treaſon, and acquitted. An obſtinate engagement between the Dutch and Britiſh fleets near the Dogger Bank, Auguſt 5. Lord Cornwallis and his army ſurrender to the united forces of France and America, October 8.

1782 Minorca ſurrendered to the Spaniards, Feb. 4. The French fleet under De Graſſe almoſt deſtroyed by Admiral Rodney, April 12. Contractors diſqualified by parliament. The Spaniſh floating batteries before Gibraltar entirely deſtroyed, September 12.

1783 Preliminaries of peace ſigned. America declared independent, Jan. 20. A dreadful earthquake, attended with many extraordinary circumſtances, in Italy and Sicily. The ſun obſcured during the whole ſummer. A volcanic eruption in Iceland ſurpaſſing any thing recorded in hiſtory: the lava ſpouted up 2 miles perpendicular, for 2 months, and covered 3600 ſquare miles of ground, in ſome places above 100 feet deep. A large meteor appears to the northward of Shetland, and takes its direction ſouthward, with immenſe velocity. Its tract obſerved for more than 1000 miles. Eaſt and Weſt Florida ceded to Spain. The order of knights of St Patrick founded in Ireland. Armiſtice betwixt Great Britain and Holland, Feb. 10. Definitive treaty of peace ratified between Great Britain, France, Spain, and the United States of America, September 3.

1784. The great ſeal ſtolen from the lord chancellor's houſe, March 24. The ratification of the peace with America arrived, April 7. Treaty of peace ratified between Great Britain and Holland, May 24. A grand jubilee in commemoration of Handel, held at Weſtminſter Abbey, May 26. A public thankſgiving, July 2. Mr Lunardi aſcended in a balloon from the Artillery ground, Moorfields, the firſt attempt of the kind in England, Sept. 15. The bull feaſts aboliſhed in Spain, except for pious or patriotic uſes by edict, November 14.

1785 Mr Blanchard and Dr Jefferies went from Dover to Calais in an air balloon, in about two hours, Jan. 7. A treaty of confederacy, to preſerve the indiviſibility of the German empire, entered into by the king of Pruſſia, the electors of Hanover, Saxony, and Mentz, May 29. M. Pilatre de Roſier and M. Romain aſcended at Boulogne, intending to croſs the channel; in 20 minutes the balloon took fire, the aeronauts fell, and were killed on the ſpot. The preliminaries of peace ſigned between the emperor and Holland, at Paris, Sept. 20. The definitive treaty ſigned, and a treaty of alliance between France and the Dutch, Nov. 16. Dr Seabury, an American miſſionary, conſtituted biſhop of Connecticut by 5 non-juring Scotch prelates in November. Lunardi aſcends from Hariot's Garden, Edinburgh, and alights in Fife between Cupar and St Andrews.

1786 The king of Sweden prohibited the uſe of torture in his dominions. Cardinal Turloue, high inquiſitor at Rome, publicly dragged out of his carriage by an incenſed multitude for his cruelty, and hung on a gibbet 50 feet high. Commercial treaty ſigned between Britain and France, greatly in favour of Britain, Sept. 26. £.471,000

3 per cent. ſtock, transferred to the landgrave of Heſſe, for Heſſian ſoldiers loſt in the American war, at 30l. a man, Nov. 21. Mr Adams, the American ambaſſador preſented Dr White of Pennſylvania, and Dr Provoſt of New York, to the Abp. of Canterbury, to be conſecrated biſhops for the United States.

1787. A court of honour eſtabliſhed by the king of Pruſſia, for the ſuppreſſion of duelling. The king of France convenes the notables for reforming abuſes in the finance. Two ſhips ſail from England, for a new ſettlement at Sierra Leone, Jan. 9; and nine ſhips with convicts for Botany Bay, March 21. Mr Burke, at the bar of the houſe of lords, impeached Warren Haſtings late governor general of Bengal, of high crimes and miſdemeanours, May 21. Dr Herſchel diſcovers two ſatellites belonging to Georgium Sidus, June 7. Twenty-three ſail of the line added to the Britiſh navy, and ſeventeen new admirals appointed. A remarkable Aurora Borealis appears, Oct. 23. Lord George Gordon committed to Newgate, Dec. 7.

1788 During the month of January, ſix perſons died at Bryngwyn in Radnorſhire, whoſe ages united made up 644 years. A dreadful hurricane at Martinico, Aug. 14. William Brodie and George Smith tried for breaking into the general exciſe office for Scotland, and ſentenced to be executed, Sept. 1. Pr. Charles Stuart, commonly called the *Pretender*, dies at Florence; whereupon the non-jurant Scots Epiſcopal clergy agree to pray for King George III. In October, the firſt ſymptoms appeared of a mental diſorder, which afflicted our gracious ſovereign. The torture aboliſhed by the king of France, Oct. 18, who alſo ordained that every perſon accuſed ſhall have counſel immediately aſſigned him; and that a majority of one may acquit the accuſed, but to condemn there muſt be a majority of three. At Wilby wharf, Shrewſbury, an *iron barge*, built by John Wilkinſon, Eſq. was launched, drawing only eight inches water, and moving very eaſily on that element, Nov. 7. On the 15th a centenary thankſgiving was held by the Church of Scotland for the revolution of 1688. M. Meſſier, aſtronomer at Paris, diſcovers a new comet in the conſtellation of Urſa Major, Nov. 26.

1789 His majeſty pronounced in a ſtate of convaleſcence, Feb. 17, and free from complaint, Feb. 26. Coins diſcovered beneath the foundation of the old market-houſe at Farnham, bearing date 1057. Dr Herſchel diſcovers another ſatellite belonging to Saturn. A general thankſgiving for the king's recovery, who attended the ſervice at St Paul's with a great proceſſion, April 23. Revolution in France, deſtruction of the baſtile, execution of the governor, &c. July 14. The national aſſembly of France aboliſh many ancient privileges, with the tithes and revenue of the clergy; confiſcate the church lands, and divide the kingdom into 83 departments. The foundation ſtone of the univerſity of Edinburgh laid, Nov. 16. Earthquake at Comrie.

1790. Monaſteries aboliſhed in France. The national aſſembly decree, that France renounces for ever all idea of conqueſt. They aboliſh all hereditary titles and armorial bearings. Exile of the duke of Orleans. Diſmiſſion of the archbiſhop of Toulouſe. Grand confederation in the Champ de Mars, on the 14th of July, when the king and the people ſwear to maintain the new conſtitution, though not then completed. A convention ſigned at the Eſcurial between his Britannic majeſty, and the king of Spain, Oct. 28.

1791 Riots at Birmingham, July 14. In June Lewis XVI. endeavours to leave France, but is brought back; and accepts the new conſtitution on the 30th Sept. The emperor and king of Pruſſia enter into a treaty againſt France at Pilnitz. A revolution in Poland, and a new conſtitution adopted. An army of French emigrants aſſemble under the Prince of Conde.

1792 The definitive treaty of peace ſigned between the Britiſh and their allies, the Nizam and Mahrattas, on the one part, and Tippoo Sultan on the other, March 19, by which he ceded one half of his territories; and delivered up two of his ſons to lord Cornwallis, as hoſtages for the fulfilment of the treaty. Guſtavus III. king of Sweden, aſſaſſinated by Ankerſtroom, and died March 29. A ſecond revolution in France, on the 10th Auguſt. The king and queen impriſoned, and many of the royaliſts maſſacred, in Auguſt and Sept. The national convention aboliſh royalty, Sept. 22, and declare France a republic. The Auſtrians defeated at Jemappe, and Savoy, Nice, Worms, Mentz, &c. taken by the French. The duke of Brunſwick enters France, and publiſhes his famous manifeſto. M. La Fayette and his companions apprehended by the Auſtrians.

1793 Lewis XVI guillotined on the 21ſt of Jan. contrary to an expreſs law of the new conſtitution, which had declared the perſon of the king inviolable. On the 25th March lord Grenville and count Woronzow ſigned a convention at London, on behalf of his Britannic majeſty and the emperor of Ruſſia, to employ their forces conjointly againſt the French. Treaties are alſo entered into with the king of Sardinia and the prince of Heſſe Caſſel. The alien bill paſſed by parliament. Bill for the ſupport of commercial credit paſſed. The board of agriculture eſtabliſhed. A new conſtitution formed in France. The French revolutionary tribunal inſtituted. Toulon ſurrendered to the Britiſh, who afterwards evacuate it. Tobago taken by the Britiſh. The queen of France tried and beheaded at Paris. The new French calendar formed, and adopted. Pondicherry taken by the Britiſh forces in India. Thomas Muir, Eſq. advocate, tried at Edinburgh for ſedition, and ſentenced to tranſportation for 14 years. The rev. Thomas Fiſche Palmer tried in Perth, on a charge of ſeditious practices, and ſentenced to tranſportation, for 7 years. Dumourier defeated, deſerts to the allies. A congreſs of the combined powers at Antwerp. Gen. Dampierre killed. Marat murdered by Charlotte Cordé. Gen. Houchard and Cuſtine, the ci-devant duke of Orleans, with Meſſrs Briſſot, Sillery, and 19 other members of aſſembly guillotined.

1794 The habeas corpus act ſuſpended. Meſſrs Skirving, Margarot, and Gerald, tried and condemned for ſedition at Edinburgh, and tranſported for 14 years. The French convention totally aboliſh ſlavery in their colonies. Hebert, Danton, Cloots, Lavoiſier, and many other members guillotined. Martinico, Guadaloupe, and other French Weſt India Iſlands, taken by the Britiſh forces. Corſica annexed to the Britiſh dominions. Lord Macartney ſent ambaſſador to China. Poland ſubjugated, after a gallant ſtruggle for liberty, by Pruſſia, and Ruſſia. Lord Howe defeats the French fleet, the latter loſing 7 ſhips of the line, June 1. Madame Elizabeth, ſiſter to Lewis XVI, tried and beheaded in France. The king of Pruſſia deſerts the allies. Gen. Clairfait 4 times defeated by Pichegru. Landrecies taken by the allies. Prince of Cobourg defeated by Jourdan. The French over-run Flanders, the Netherlands, the Rhine, Navarre, and all Catalonia. Part of the allies retreat. Roberſpierre and his adherents guillotined at Paris. Thomas Paine and other 70 deputies, who had been long impriſoned, reſtored to their ſeats. The Jacobin club ſuppreſſed. Carrier executed for his cruelties. Gen. Dampierre killed. The Telegraph invented. Watt and Downie tried at Edinburgh for high treaſon and condemned. The former executed and the latter pardoned. Meſſrs Hardy, Horne Tooke, and Thelwall, tried for high treaſon at London, and acquitted.

1795 The long continued froſt having rendered all the rivers in the Netherlands paſſable, the French eaſily over-run the United Provinces, and are joyfully received by the inhabitants. The Stadtholder and his family take refuge in England. The Dutch form an alliance with France, and a new conſtitution on the French model. The Auſtrian Netherlands annexed to France. Guadaloupe retaken, with the greater part of St Lucia and Grenada, by the French. Gen. Lindſay kills himſelf. A French victualling fleet taken by Sir E. Pellew. The Berwick taken by the French. The French fleet defeated by Admiral Hotham. The Prince of Wales married, his eſtabliſhment ſettled, and his debts paid a ſecond time by the Britiſh parliament. A loan of £4,600,000 voted to the emperor. The trial of Warren Haſtings concluded on the 28th April, when he is acquitted of the charges brought againſt him by the houſe of commons. The exportation of grain prohibited and the diſtilleries ſtopped. Treaty of peace and alliance ſigned between Pruſſia and France. The French take Luxembourg. Negapatam taken by the Britiſh. St Paul's church, Covent Garden, burnt. Scarcity of bread in Britain. The king inſulted, in going to parliament. Bills paſſed for preſerving his majeſty's perſon, and preventing ſeditious meetings. A bounty ordered on imported grain. Bread at 15d the quartern loaf in London.

1796 Ceylon ſurrendered to the Britiſh. The rebel chiefs Stofflet and Charette killed, and the rebellion in La Vendee enterely quelled. The Auſtrians defeated by Gen. Buonaparte. The French repulſed by Beaulieu. They take Ceva, and defeat the Piedmonteſe at Cheraſco. Peace between France and Sardina. The Auſtrians defeated at Fombio and Lodi, and repulſed at Codogno. Death of Gen. La Harpe. Lombardy over-run by the French. Diſcontents between France and the United States. The Batavian Convention meet, and declare war againſt Britain. The French take poſſeſſion of Leghorn, Bologna, Ferrara, and Urbino. Aſſignats extinguiſhed and mandats iſſued in France. The French poſſeſſed of the courſe of the Rhine, and circles of Suabia and Franconia. Princes of Wirtemberg and Baden make peace with France. Treaty of peace and alliance between France and Spain. Nuremberg ſeized by the king of Pruſſia, and evacuated. French armies under Jourdan and Moreau retreat. Moreau defeats the Auſtrians and repaſſes the Rhine. The Auſtrians defeated at Roveredo and Baſſano. Conſpiracy of Babeuf, Drouet, &c. againſt the French Directory. Religious worſhip reſtored in France and a national literary academy inſtituted. A revolt in Grenada quelled. St Lucia and St Vincents reduced by the Britiſh. Colonels Sandford and Fitch killed in the Maroon war in Jamaica. The Maroons ſubmit. Britiſh manufactures prohibited by France, Spain, and Holland. Corſica evacuated by the Britiſh. Peace concluded with France, by the courts of Naples and Parma. Capture of the Dutch fleet at the Cape, by the Britiſh. The Auſtrians over-run the palatinate of the Rhine, and drive the French out of Germany; but are defeated at Neuwied and Arcole, by Buonaparte. Gen. Waſhington reſigns the preſidency of the United States. Lord Malmeſbury ſent to Paris to treat for peace, but fails. The French attempt an invaſion of Ireland, which alſo fails. The republic of Lombardy formed. Khel taken by the archduke Charles. Death of Catharine II, and acceſſion of Paul.

1797 The Auſtrians defeated by Buonaparte: 60 pieces of cannon and 23,000 priſoners taken. Trent, Roveredo, and Mantua taken by the French. Huningen captured by the Auſtrians. The Pope's army defeated by Buonaparte, and 12,000 priſoners taken. He makes peace with the French. The Spaniſh fleet defeated by Sir John Jervis, Feb. 14. ſince created earl St Vincent, and 4 ſhips of the line captured, Trinadad taken by Sir R. Abercromby and Adm. Harvey. Commercial treaty ſigned between Britain and Ruſſia: 1200 Frenchmen landed on the coaſt of Pembrokeſhire. Bank of England prohibited from iſſuing ſpecie. Mutiny, in the Portſmouth fleet: Settled amicably, and the ſeamen's wages raiſed. The Auſtrians defeated at Neuwied by Gen. Hoche: 4000 priſoners taken. A mutiny in the fleet at Spithead and St Helens. Lord Lieut. of Ireland iſſues a proclamation for ſuppreſſing the Societies of United Iriſhmen: Four ſoldiers ſhot at Belfaſt for being members of that aſſociation. A conſiderable part of Ireland under martial law. The Princeſs R. of Britain married to the Pr. of Wirtemberg. Pay of the Britiſh army increaſed. The right hon. Edmund Burke, died June 9. A mutiny in the ſquadron at Yarmouth and Sheerneſs: It is terminated: Parker and many others executed. Lord Malmeſbury ſent to France, a ſecond time, to treat of peace. Cadiz bombarded by the Britiſh fleet. Scots Militia Act paſſed. A ſignal poſt erected on Arthur's ſeat. La Fayette and his fellow priſoners releaſed and exchanged for the ci-devant Princeſs Royal of France. Riot at Tranent about the militia act. Conſpiracy of the royaliſts diſcovered at Paris: Carnot, Barthelemy, Pichegru and others concerned in it, tranſported. William Orr executed at Carrickfergus for adminiſtering unlawful oaths. Lord Malmeſbury ordered to quit France. Death of Gen. Hoche. The Dutch fleet defeated by Adm. Duncan, Oct. 11, and 9 ſhips of the line taken, with 3 admirals. Peace concluded between France and the emperor, Oct. 17. The French reſolve to invade England. Death of Frederick William II, king of Pruſſia. A general thankſgiving held for the victory over the Dutch fleet. The king, queen, &c. go in proceſſion to St Paul's church.

1798 The double, triple, and quadruple aſſeſſment bill paſſed in the Britiſh Parliament. George Mealmaker, tried for ſedition at Edinburgh, and ſentenced to be tranſported for 14 years. A dreadful rebellion in Ireland, which was not quelled till the inſurgents had been ſeveral times defeated in battle, and much blood ſhed. The glorious victory of Adm. Nelſon at Aboukir, near the mouth of the Nile, Aug. 1, in which 9 French ſhips of the line were taken, and two burnt; only two eſcaping, which were afterwards taken. The Swiſs finally defeated, and their independence aboliſhed by the French, Sept. 19. At New York the yellow fever carried off 3000 people within a few months, but its violence abated November 15.

1799. The war againſt France recommenced by the emperor; and the French driven out of almoſt all their conqueſts in Italy, by the Auſtrians and Ruſſians under Sowarrow. A terrible earthquake at Guernſey. Seringapatam taken by lieut.-gen. Harris, and Tippoo Sultan killed. Mantua ſurrenders to the Auſtrians, June 30. Admiral Mitchell takes ſeven ſhips of war, and 13 Indiamen and tranſports in the Nieuve Diep, Aug. 27. In Nov. the Britiſh and Ruſſian forces are obliged to evacuate Holland. The directorial government aboliſhed in France, and a new conſtitution framed, according to which Bonaparte was to be firſt conſul for ten years, Dec. 25. Bonaparte makes overtures of peace, with a letter addreſſed to the king of Great Britain, and is replied to by lord Grenville.

1800 An attempt made on the life of his Britannic majeſty by James Hadfield, a lunatic, who fired a piſtol at him in Drury-lane theatre, May 15. The battle of Marengo gained by Bonaparte; and followed by an armiſtice, and the ſurrender of all the ſtrong places held by the Auſtrians in Italy, June 15. The bill for uniting Britain and Ireland ſigned July 2. The Marlborough, a Britiſh ſhip of 74 guns, wrecked off Belleiſle, Nov. 4. A dreadful ſtorm at London unroofs many houſes, blows down others, and tears up many trees, in conſequence of which ſome lives are loſt, Nov. 9.

1801 The union of Britain with Ireland took place, Jan. 1, and the firſt united parliament met, Jan. 22. The emancipation of the Catholics not being attained, the cabinet council is divided. The right hon. William Pitt ſent in to his majeſty his reſignation of the offices of chancellor of the exchequer and firſt lord of the treaſury, after having been miniſter 17 years, Feb. 6. The peace of Luneville, between France and Auſtria, ſigned Feb. 9. Mr Pitt delivered the ſeals of his office to his Majeſty, which were immediately given to Mr Addington, March 14. The battle of Alexandria in Egypt gained by the Britiſh troops, in which the brave general Abercrombie was mortally wounded, March 21. The death of the emperor Paul of Ruſſia; he is ſucceeded by his ſon Alexander I. March 24. The battle of Copenhagen, in which 18 ſhips were taken or deſtroyed by lord Nelſon, April 2. Preliminaries of peace ſigned by lord Malmeſbury on the part of Britain, and M. Otto on the part of the French republic, Oct. 1. An attempt made on Bonaparte's life by exploding a barrel of gun-powder. Alexandria ſurrenders to Gen. Hutchinſon, Sept. 2.

1802 The definitive treaty of peace, between Great Britain and the French republic, ſigned at Amiens March 27, and peace proclaimed between Britain and France, April 29. At Bromley, the flour mills belonging to Meſſrs Metcalf and Co. were burnt to the ground, April 8. Revolution in St Domingo, and horrid maſſacres there; Touiſſant, the black general, carried priſoner to Breſt. In the town of Bedford 72 houſes were deſtroyed by fire, and about 700 perſons deprived of their all, May 13. A general thankſgiving obſerved for the reſtoration of peace, June 1. The foundation of the London docks at Wapping, laid by the chancellor of the exchequer, June 26. The Weſt India docks at Blackwall, opened Aug. 27. The yellow fever rages at Philadelphia and New York, in conſequence of which intercourſe with them is forbidden at Wilmington, Delaware, Sep. 5. The Britiſh legiſlature, prohibit the publication of books without the printer's name at the beginning and end, Oct. 20. The liberty of the Swiſs annihilated by the conſular armies of France. Gen. Andreoſſi, ambaſſador from France, has an audience of his Britannic majeſty, Nov. 17. Lord Whitworth miniſter plenipotentiary from Britain, preſents his letters of credence to Bonaparte, Dec. 5.

1803 A meſſage from his Britannic majeſty delivered to both houſes of parliament, announcing the military preparations that were carrying on in the ports of France and Holland. Preſs warrants iſſued, March 8. Another meſſage announcing the termina- of the diſcuſſion between his majeſty and the French republic, and the recal of the Britiſh ambaſſador from Paris. French ambaſſador left London, May 16. Every Britiſh ſubject in France is impriſoned by Bonaparte, without regard to ſex or deſcription. In China the rebellion of Ong Fong, a daring chief, at the head of 50,000 men, is ſuppreſſed. At Tanjore, one of the queens of the deceaſed Rajah burns herſelf on the funeral pile, regardleſs of the tears and intreaties of her relations. The city and electorate of Hanover taken poſſeſſion of by the French under general Mortier, June 5. An inſurrection in Dublin, in which lord Kilwarden, chief juſtice of the court of king's bench in Ireland, and his nephew Mr Wolfe, were inhumanly murdered, July 23. Official returns laid on the table of the houſe of commons, ſtating the number of volunteers in Great Britain, at 379,943, Dec. 9. St Domingo evacuated by the French, 5000 of whom, with ſeveral frigates and ſmall veſſels come over to Jamaica, and ſurrender themſelves.

1804. Admiral Story, with two captains, declared diſgraced, perjured, and infamous, are diſpoſted and baniſhed the republic for life, Jan. 16. At Perth a ſplendid meteor is ſeen, Feb. 7. Remarkable eclipſe of the ſun, Feb. 11. The duke d'Enghien ſeized by Bonaparte on a neutral territory, April 3; ſhot in the night in the wood of Vincennes, April 11. Mr Pitt again appointed to the office of chancellor of the exchequer, May 10. Bonaparte proclaimed emperor of the French, May 30. To the Caledonian canal government grants 50,000l. Francis II. emperor of Germany and king of Hungary, aſſumes the title of emperor of Auſtria, Sept. 5. War betwixt Britain and Spain commences in October. Sir George Rumbold, the Engliſh reſident at Hamburgh, ſeized by a party of French ſoldiers, and ſent to Hanover, and thence to Paris, Nov. 2. Bonaparte crowned emperor of the French by the Pope, at Paris, Dec. 2.

1805 A flag of truce came out from Boulogne and delivered to captain Owen of the Immortalite, diſpatches containing a letter from Bonaparte to his Britannic majeſty, (dated Jan. 1,) expreſſing in general terms, a wiſh to put an end to the calamities of war, Jan. 7. The Italian republic declared an hereditary monarchy, by the title of The Kingdom of Italy. Bonaparte *accepts* the crown, March 17. The London dock opened, May 25. Bonaparte crowned king of Italy at Milan, 26. Geneva annexed to France, June 4. Sir R. Calder, with 15 ſhips, defeats the combined fleets of France and Spain, and takes 2 ſhips, July 22. Duke of Glouceſter dies, Aug. 25. Hoſtilities between France and the allied powers of Auſtria and Ruſſia commence, Oct. 7. General Mack ſurrenders Ulm with the flower of the Auſtrian army by capitulation, Oct. 17. Viſcount Nelſon, off Trafalgar, with 27 ſhips, totally defeats the combined fleets of France and Spain, amounting to 33 ſail, of which 19 are taken. Lord Nelſon being killed, admiral, afterwards lord Collingwood, finiſhes the battle. Tempeſtuous weather obliges him to deſtroy all his prizes except four, Oct. 21. A revolution in St Domingo, Deſſalines is aſſaſſinated, and Chriſtophe ſucceeds, who grants a free commerce to all nations. Sir R. Strachan, with four ſhips, attacks and takes an equal number of French ſhips, which had eſcaped from Trafalgar, Nov. 4. Bonaparte enters Vienna, Nov. 13. The Ruſſians and Auſtrians totally defeated at Auſterlitz, Dec. 2. Armiſtice between France and Auſtria, on the 4th, and peace between theſe powers ſigned on the 27th December.

1806 Bonaparte creates the electors of Bavaria and Wirtemberg kings. The Cape of Good Hope taken by the Britiſh under general Baird and Sir H. Popeham, Jan. 10. The death of Mr Pitt, on the 23d Jan. cauſes a total change of the Britiſh miniſtry in Feb. Maſſena takes poſſeſſion of Naples for Joſeph Bonaparte, who is crowned king. Sir John Duckworth off St Domingo, attacks a French fleet of 7 ſhips of the line, takes 3 and burns 2, Feb. 6. Britain declares war againſt Pruſſia, by laying an embargo on her ſhips, April 15. Louis Bonaparte made king of Holland. Viſcount Melville tried for high crimes and miſdemeanours, by impeachment before the houſe of lords, April 29, and acquitted, June 12. Buenos Ayres taken by the Britiſh under gen. Beresford and Sir H. Popham, June 26. The Germanic conſtitution diſſolved by the Confederation of the Rhine, formed by Bonaparte, July. The emperor of Germany reſigns his dignity as *Emperor of Germany*, and the HOLY ROMAN EMPIRE diſappears, Aug. 6. Buenos Ayres retaken by the Spaniards, Aug. 12. Gen. Sir John Stuart defeats a ſuperior French army in Calabria, July 4. The London Weſt India dock, (Blackwall) opened, July 14. Lord Lauderdale arrives at Paris in Auguſt to negociate for peace, but returns in Oct. without accompliſhing his object. Mr Fox dies 13th Sept. and lord Thurlow about the ſame time. Hoſtilities between France and Pruſſia commence, Oct. 8. The Pruſſians totally defeated with immenſe loſs, at Auerſtadt, near Jena, Oct. 14. Prince Hohenloe, the Pruſſian commander in chief, obliged to capitulate to the French, after the battle of Prenzlou, Oct. 20. The French enter Berlin in triumph, October 22. The firſt imperial parliament diſſolved, and orders iſſued for calling another, Oct. 24. The Pruſſian general Blucher defeated, and ſurrenders himſelf and army to the French, after a dreadful carnage, at Lubec, Nov. 7. Bonaparte makes offer to the Poles, to aſſert their independence, Nov. 8. The duke of Brunſwick dies of the wounds he received at the battle of Jena, Nov. 10. A veſſel arrives from the Weſt Indies at the Broomielaw, Glaſgow, being the firſt of the kind brought into that place, Nov. 15. The French army, under Mortier, takes poſſeſſion of Hamburgh, and ſeizes all the Britiſh property, Nov. 19. Lord Hutchinſon ſent from Britain on a miſſion to the court of Pruſſia, Nov. 20. Bonaparte enters Warſaw, the capital of Poland, Dec. 19. The battle of Pultuſk, between Bonaparte and the Pruſſians, when the French are repulſed, and loſe 10,000 men killed and taken priſoners, Dec. 25.

1807 Battle of Mohringen, when the French diviſions of Ney and Bernadotte were completely defeated, with the loſs of 4,000 men, and all their baggage, Jan. 25. Battle of Eylau, in Poland, where Bonaparte was defeated by gen. Benningſen, after four days fighting, with the loſs of 15,000 killed, and 2000 priſoners, and 19 eagles, Feb. 8. Slave-trade bill paſſed the Britiſh houſe of lords, Feb. 10, and of commons, receiving the royal aſſent on the 25th March. The firſt reading of the bill for regulating the Scots Courts, moved by lord Grenville in the houſe of lords, Feb. 16. Lord Howick's Catholic bill cauſes a complete change in the Britiſh cabinet. A Britiſh fleet under adm. Duckworth, forces the paſſage of the Dardanelles, and burns ſeveral Turkiſh ſhips, March 28. The duke of Richmond appointed lord-lieut. of Ireland, April 1. Viſcount Melville ſworn of the privy-council, and the earl of Dalkeith, and marquis of Huntly created Britiſh peers, April 11. Parliament diſſolved, April 29. An inſurrection at Conſtantinople, and the emperor Selim is dethroned, ordered to take poiſon, obeys, and dies in a ſhort time. Muſtapha mounts the throne, May 26, 27. An important and deciſive victory is obtained by the French grand army over the Ruſſians at Friedland; the loſs great on both ſides; but negociations for peace are immediately entered upon, June 15. Glatz in Sileſia, ſurrenders by capitulation to the French, who take Konigſberg, in which there were immenſe ſtores, June 16. The third imperial parliament opened, June 22. An armiſtice concluded between Ruſſia and France. A miſunderſtanding betwixt the Britiſh frigate Leopard and American ſhip Cheſapeake, reſpecting Britiſh deſerters, and the conduct of the Britiſh officer excites the indignation of America, June 23. The emperors of Ruſſia and France have an interview and conference on the river Niemen, on a raft conſtructed for the occaſion, June 24; and on the 26th they dine together, with the king of Pruſſia, at Tilſit. Preſident Jefferſon, of America, iſſues a ſpirited proclamation reſpecting the conteſt between the Leopard and Cheſapeake, July 2. The Britiſh under gen. Whitelocke, are repulſed with conſiderable loſs in an attack upon Buenos Ayres, enter into a capitulation, and agree to evacuate all the ſettlements, on the river Plata in two months, July 5. Treaty of peace between France and Ruſſia ſigned at Tilſit, July 12. A fleet of 17 ſhips of the line, &c. with troops, under adm. Gambier and lord Cathcart, ſail from Britain to take poſſeſſion of Zealand, Copenhagen, &c. and prevent the Daniſh fleet and arſenals from the depredations of the French, July 26. Dr Jenner has 20,000l. voted to him by the Britiſh parliament, as a further reward for his invaluable diſcovery of the cowpock inoculation, July 29. A monument to the memory of lord Nelſon, in the Green of Glaſgow, 145 feet high, is completed, Aug. 7. Jerome Bonaparte created king of Weſtphalia, and crowned at Paris, Aug. 15. Stralſund taken poſſeſſion of by the French, Aug. 20. The Daniſh ſhipping and naval ſtores, are delivered up by capitulation to the Britiſh forces, after three days bombardment, Sept. 7, and arrive in Engliſh ports in October. Alexandria and Egypt evacuated by the Britiſh, Sept. 22. A monument erected in Weſtminſter Abbey to the memory of the famous Corſican general Paoli. The Britiſh government declares France, with her European allies and dependants, in a ſtate of blockade, Nov. 2. A rupture with Ruſſia announced to the lord mayor of London, Dec. 2.

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(1.) * A CHRONOMETER. *n. ſ.* [χρονος and μετρον.] An inſtrument for the exact menſuration of time.—According to obſervation made with a pendulum *chronometer*, a bullet, at its firſt diſcharge, flies five hundred and ten yards in five half ſeconds. *Derham.*

(2.) CHRONOMETER, although it may be applied to any inſtrument uſed in meaſuring time, ſuch as a DIAL, CLOCK, or WATCH, is, however, generally uſed in a more limited ſenſe, for a kind of clock ſo contrived as to meaſure a ſmall portion of time with great exactneſs, even to the 16th part of a ſecond: of ſuch a one there is a deſcription in Deſagulier's experimental philoſophy, invented by the late ingenious Mr George Graham; which muſt be allowed to be of great uſe for meaſuring ſmall portions of time in aſtronomical obſervations, the time of the fall of bodies, the velocity of running waters, &c. But long ſpaces of time cannot be meaſured with ſufficient exactneſs unleſs its pendulum be made to vibrate in a cycloid; becauſe, otherwiſe it is liable to err conſiderably, as all clocks are that have ſhort pendulums that ſwing in large arches of a circle. Several machines have been contrived for meaſuring time, under the name of CHRONOMETERS, upon principles very different from thoſe on which clocks and watches are conſtructed.

(3.) CHRONOMETER, AIR, is repreſented in *Plate* LXV. *fig.* 16. which is conſtructed in the following manner. Provide a glaſs tube of about an inch diameter, and 3 or 4 feet long: the diameter of the inſide of this tube muſt be preciſely equal in every part: at the bottom muſt be a ſmall hole, cloſely covered with a valve. In the tube place a piſton E, *fig.* 17. which is made to fit it exactly, and muſt be oiled, that it may move in the tube with the greateſt freedom: in this piſton there is a cock that ſhuts quite cloſe; and from the top of it there goes a cord F, which paſſes through the handle G. The cock of the piſton being cloſed, it is to be let down to the bottom of the tube, and being then drawn up to the top, the air will then ruſh in by the valve at the bottom of the tube, and ſupport the piſton. Then turn the cock, ſo as to make a very ſmall vent; and the air paſſing ſlowly through that vent, the piſton will gradually deſcend, and ſhow the hour, either by lines cut in the tube with a diamond, or marked with paint, or by ſmall ſlips of paper printed on the glaſs. If the air chronometer ſhould go too faſt or too ſlow, it may be eaſily regulated by altering the poſition of the cock in the piſton, as it is on that the whole depends. If, inſtead of marking the tube, it is wiſhed to ſhow the time by a dial, it may be eaſily effected by placing an axis to which the hand of the dial is fixed, directly over the tube, and winding the ſtring to which the piſton is joined round that axis; for then, as the piſton deſcends, the axis will gradually turn the hand, and ſhow the hour: but it muſt be obſerved, that as the deſcent of the piſton is not conſtantly regular, on account of the decreaſe of reſiſtance from the quantity of the ſubjacent air as the piſton deſcends, the axis therefore muſt not be a regular cylinder, but conical like the fuſee of a watch, as in *fig.* 18. by which means the motion of the hand of the dial will be conſtant and regular.

(4.) CHRONOMETER, LAMP, is repreſented in *fig.* 19. It conſiſts of a chamber lamp A, which is a cylindrical veſſel about three inches high, and one inch diameter, placed in the ſtand B. The inſide of this veſſel muſt be every where exactly of the ſame diameter. To the ſtand, B, is fixed the handle, C, which ſupports the frame DEFG, about 12 inches high, and 4 wide. This frame is covered with oiled paper, and divided into 12 equal parts by horizontal lines; at the end of which are wrote the numbers for the hours, from 1 to 12, and between the horizontal lines are diagonals that are divided into halves, quarters, &c. On the handle C, and cloſe to the glaſs, is fixed the ſtyle or gnomon H. Now, as the diſtance of the ſtyle from the flame of the lamp is only half an inch, if the diſtance of the frame from the ſtyle is only ſix inches, then, while the float that contains the light deſcends, by the decreaſe of the oil, one inch, the ſhadow of the ſtyle on the frame will aſcend 12 inches, that is, its whole length, and ſhow by its progreſſion the regular increaſe of the hours, with their ſeveral diviſions. It is abſolutely neceſſary, that the oil uſed in this lamp be always of the ſame ſort and quite pure, and that the wick alſo be conſtantly of the ſame ſize and ſubſtance, as it is on theſe circumſtances, and the uniform figure of the veſſel, that the regular progreſs of the ſhadow depends.

(5.) CHRONOMETER, MUSICAL, an inſtrument invented by *Loulie*, a French muſician, for meaſuring time by means of a pendulum. The form of the inſtrument, as deſcribed by him, is that of an Ionic pilaſter, and is thus deſcribed by Malcolm in his *Treatiſe of Muſic*. p. 407.—"The chronometer conſiſts of a large ruler or board, ſix feet long, to be ſet on end; it is divided into 72 inches, and the numbers ſet ſo as to count upwards; and at every diviſion there is a ſmall round hole, through whoſe centre the line of diviſion runs. At the top of this ruler, about an inch above the diviſion 72, and perpendicular to the ruler, is inſerted a ſmall piece of wood, in the upper ſide of which there is a groove, hollowed along from the end that ſtands out to that which is fixed in the ruler, and near each end of it a hole is made: through theſe holes a pendulum cord is drawn, which runs in the groove: at that end of the cord which comes through the hole furtheſt from the ruler, the ball is hung; and at the other end there is a ſmall wooden pin, which can be put in any of the holes of the ruler: when the pin is in the uppermoſt hole at 72, then the pendulum from the top to the centre of the ball is exactly 27 inches; and therefore, whatever hole of the ruler it is put into, the pendulum will be juſt ſo many inches as that figure at the hole denotes. The manner of uſing the machine is this: The compoſer lengthens or ſhortens his pendulum, till one vibration be equal to the deſigned length of his bar, and then the pin ſtands at a certain diviſion, which marks the length of the pendulum; and this number being ſet with the cliff at the beginning of the ſong, is a direction for others how to uſe the chronometer in meaſuring the time according to the compoſer's deſign; for with the number is ſet the note, crotchet, or minim, whoſe value he would have the vibration to be; which in briſk duple time is beſt a minim or half bar, or even a whole bar, when that is but a minim; and in ſlow time a crotchet. In triple time, it ſhould be the 3d part or half, or 4th part of a bar; and in the ſimple triples that are allegro, let it be a whole bar. And if, in every time that is allegro, the vibration is applied to a whole or half bar, practice will teach to ſubdivide it juſtly and equally. To make this machine of univerſal uſe, ſome canonical meaſure of the diviſions muſt be agreed upon, that the figure may give a certain direction for the length of the pendulum.

CHRONOSCOPE, *n. ſ.* the ſame with CHRONOMETER.

CHROSTASIMA, in natural hiſtory, a genus of pellucid gems, comprehending all thoſe which appear of one ſimple and permanent colour in all lights; ſuch are the diamond, carbuncle, ruby, garnet, amethyſt, ſapphire, beryl, emerald, and the topaz. See DIAMOND, CARBUNCLE, &c.

CHRYSA, in ancient geography, a town of Myſia, on the ſinus Adramyttenus; extinct in Pliny's time. It had a temple of Apollo Smintheus, and was the country of the fair Bryſeis, who was the cauſe of the quarrel between Agamemnon and Achilles.

(I.) * CHRYSALIS. *n. ſ.* [from χρυσος, gold, becauſe of the golden colour in the nymphæ of ſome inſects] A term uſed by ſome naturaliſts for aurelia, or the firſt apparent change of the maggot of any ſpecies of inſects. *Chambers.*

(II.) Chrysalis, or Aurelia, in natural hiſtory, is that ſtate of reſt and ſeeming inſenſibility, which butterflies, moths, and ſeveral other kinds of inſects, muſt paſs through before they arrive at their winged or moſt perfect ſtate. In this ſtate, no creatures afford ſo beautiful a variety as the butterfly kinds, and they all paſs through this middle ſtate without one exception.

(III.) Chrysalis, description of the. The figure of the aurelia or chryſalis generally approaches to that of a cone, or at leaſt the hinder part of it is in this ſhape; and the creature, while in this ſtate, ſeems to have neither legs nor wings, nor has any power of walking. It ſeems indeed to have hardly ſo much as life. It takes no nouriſhment in this ſtate, nor has it any organs for taking any; and indeed its poſterior part is all that ſeems animated, this having a power of giving itſelf ſome motions. The external covering of the chryſalis is cartilaginous, and conſiderably large, and is uſually ſmooth and gloſſy: but ſome of them have a few hairs; ſome are alſo as hairy as the caterpillars from which they are produced; and others are rough, and, as it were, ſhagreened all over. In all theſe there may be diſtinguiſhed two ſides; the one of which is the back, the other the belly of the animal. On the anterior part of the latter, there may always be diſtinguiſhed certain little elevations running in ridges, and reſembling the fillets wound about mummies: the part whence theſe have their origin, is eſteemed the head of the animal. The other ſide, or back, is ſmooth, and of a rounded figure in moſt of the chryſaliſes; but ſome have ridges on the anterior part, and ſides of this part; and theſe uſually terminate in a point, and make an angular appearance on the chryſalis.

(IV.) Chrysalises, distinction of. From this difference is drawn the firſt general diſtinction of theſe bodies. They are by this divided into two claſſes; the round and the angular kinds. The firſt are, by the French naturaliſts, called feves; from the common cuſtom of calling the chryſalis of the ſilk worm, which is round, by this name. There is ſomething more regular in this diſtinction than might at firſt be conceived; for the diviſion is continued from the fly-ſtate: the rounded chryſaliſes being almoſt all produced by the *phalenæ* or moths; and the angular ones by the *papilios*, or day flies. There are ſeveral ſubordinate diſtinctions of theſe kinds; but, in general, they are leſs different from one another than the caterpillars from whence they are produced.

1. Chrysalises, angular. The head of thoſe of the firſt claſs uſually terminate by two angular parts, which ſtand ſeparate one from the other, and reſemble a pair of horns. On the back, eminences and marks are diſcovered, which imagination may form into eyes, noſe, chin, and other parts of the human face. There is a great variety and a great deal of beauty in the figures and arrangement of the eminences and ſpots on the other parts of the body of the chryſaliſes of different kinds It is a general obſervation, that thoſe chryſaliſes which are terminated by a ſingle horn, afford day butterflies of the kind of thoſe which have buttoned antennæ, and whoſe wings, in a ſtate of reſt, cover the under part of their body, and which uſe all their ſix legs in walking, thoſe of many other kinds uſing only 4 of them. Thoſe chryſaliſes which are terminated by two angular bodies, and which are covered with a great number of ſpines, and have the figure of a human face on their back in the greateſt perfection, afford butterflies of the day kind; and of that claſs the characters of which are, their walking on four legs, and uſing the other two, that is, the anterior part, in the manner of arms or hands. The chryſaliſes which have two angular bodies on their heads, but ſhorter than thoſe of the preceding, whoſe back ſhows but a faint ſketch of the human face, and which have fewer ſpines, and thoſe leſs ſharp, always turn to that ſort of butterfly the upper wings of which are divided into ſegments, one of which is ſo long as to repreſent a tail, and whoſe under wings are folded over the upper part of the back. A careful obſervation will eſtabliſh many more rules of this kind, which are not ſo perfect as to be free from all exceptions; yet are of great uſe, as they teach us in general what ſort of fly we are to expect from the chryſalis, of which we know not the caterpillar, and therefore can only judge from appearance. Among the angular chryſaliſes there are ſome whoſe colour ſeem as worthy our obſervation as the ſhapes of the others. Many of them appear ſuperbly clothed in gold. Theſe elegant ſpecies have obtained the name of *chryſalis* and *aurelia*, which are derived from Greek and Latin words, ſignifying gold; and from theſe all other bodies of the ſame kind have been called by the ſame names, though leſs, or not at all entitled to them. As ſome kinds are thus gilded all over, ſo others are ornamented with this gay appearance in a more ſparing manner, having only a few ſpots of it in different places on their back and belly. Theſe obvious marks, however, are not to be depended upon as certain characters of diſtinction: for accidents in the formation of the chryſalis may alter them; and thoſe which naturally would have been gilded all over, may be ſometimes only ſo in part; and either theſe or the others may, by accident, be ſo formed, as to ſhow nothing of this kind at all, but be only of a duſky brown. Thoſe, however, which have neither ſilver nor gold to recommend them to the eye, do not want other colours, and thoſe beautifully variegated. Some of them are all over of an elegant green, as is the chryſalis of the fennel caterpillar; others of an elegant yellow; and ſome of a bright greeniſh tinge, variegated with ſpots of a ſhining black. We have a very beautiful inſtance of this laſt kind in the chryſalis of the elegant cabbage caterpillar. The general colour of the chryſalis of the common butterflies, however, is brown. Some are alſo of a fine deep black; and of theſe many are ſo ſmooth and gloſſy, that they are equal to the fineſt Indian japan. The common caterpillar of the fig-trees gives an in-

ſtance of one of theſe moſt beautiful gloſſy ones; the caterpillar of the vine affords another of theſe fine black chryſaliſes.

(2.) Chrysalises, rounded. The round chryſaliſes have alſo their different marks, as regular as the angular. The greater number of the round chryſaliſes have the hinder part of their body of the figure of a cone, but the upper end, which ought to be its circular plane baſe, is uſually bent and rounded into a ſort of knee: this is uſually called the head of the chryſalis; but there are alſo ſome of this kind, the head of which is terminated by a nearly plane ſurface; ſome of the creeping ten legged caterpillars give chryſaliſes of this kind, which have each of them two eminences that ſeem to bring them towards the angular kind. The rounded chryſaliſes do not afford any thing of that variety of colouring ſo remarkably beautiful in the angular ones; they are uſually of a duſky yellow, in different ſhades, and are often variouſly ſpotted with black; but theſe as well as all other chryſaliſes, before they arrive at their fixed colour, paſs through ſeveral other temporary ones; ſome being of a different colour when firſt produced from the caterpillar, from what they are a few days afterwards; and ſome varying ſo greatly, though only in degree, as not to be diſtinguiſhable, even by the moſt converſant eye, from what they were when firſt produced. The green rough caterpillar of the cabbage has a chryſalis which is green at firſt; and from that gradually goes through all the ſhades of green to a faint yellow, which is its laſting colour; and one of the oak catterpillars yields a chryſalis beautifully ſpotted with red at its firſt appearance; but theſe ſpots change to brown for their fixed colour: the third day from their formation uſually fixes their laſting colours; and if they are obſerved to turn black in any part after this time, it is a ſign they are dead or dying.

(V.) Chrysalises, parts, metamorphoses, &c. of. The ſeveral ſpecies of inſects, as flies, ſpiders, and ants, do not differ more evidently from one another in regard to appearance, than do a caterpillar, its chryſalis, and a butterfly produced from it; yet it is certain, that theſe are all the product of the ſame individual egg; and nothing is more certain, than that the creature which was for a while a caterpillar, is, after a certain time, a chryſalis, and then a butterfly. Theſe great changes produced in ſo ſudden a manner, ſeem like the *metamorphoſes* recorded in the fables of the ancients; and indeed it is not improbable that thoſe tables firſt took their origin from ſuch changes. The parts being diſtinguiſhable in the chryſalis, we eaſily find the difference of the ſpecies of the fly that is to proceed from it. The naked eye ſhows whether it be one of thoſe that have, or of thoſe that have not, a trunk; and the aſſiſtance of a microſcope ſhows the antennæ ſo diſtinctly, that we are able to diſcern whether it belongs to the day or night claſs; and often what genus, if not the very ſpecies: nay, in the plumoſe horned kinds, we may ſee, by the antennæ, whether a male or female phalæna is to be produced from the chryſalis; the horns of the female being in this ſtate evidently narrower, and appearing leſs elevated about the common ſurface of the body, than thoſe of the male. All theſe parts of the chryſalis, however, though ſeen very diſtinctly, are laid cloſe to one another, and ſeem to form only one maſs; each of them is covered with its own peculiar membrane in this ſtate, and all are ſurrounded together by a common one; and it is only through theſe that we ſee them; or rather we ſee on theſe the figures of all the parts moulded within, and therefore it requires attention to diſtinguiſh them. The chryſalis is ſoft when firſt produced, and is wetted on the front with a viſcous liquor; its ſkin, though very tender at the firſt, dries and hardens by degrees: but this viſcous liquor, which ſurrounds the wings, legs, &c. hardens almoſt immediately; and in conſequence faſtens all thoſe limbs, &c. into a maſs, which were before looſe from one onother: this liquor, as it hardens, loſes its tranſparence, and becomes brown; ſo that it is only while it is yet moiſt that theſe parts are to be ſeen diſtinct. It is evident from the whole, that the chryſalis is no other than a butterfly, the parts of which are hid under certain membranes which faſten them together; and when the limbs are arrived at their due ſtrength, they become able to break through theſe membranes, and then expand and arrange themſelves in their proper order. The firſt metamorphoſis, therefore, differs nothing from the ſecond, except that the butterfly comes from the body of the caterpillar in a weak ſtate, with limbs unable to perform their offices, whereas it comes from the chryſalis perfect.

(VI.) Chrysalises, structure and uses of. M. Reaumur has given us many curious obſervations on the ſtructure and uſes of the ſeveral coverings that attend the varieties of the caterpillar kind in this ſtate. The creatures in general remain wholly immoveable in this ſtate, and ſeem to have no buſineſs in it but a patient attendance on the time when they are to become butterflies; and this is a change that can happen to them, only as their parts, before extremely ſoft and weak, are capable of hardening and becoming firm by degrees, by the tranſpiration of that abundant humidity which before kept them ſoft: and this is proved by an experiment of M. Reaumur, who, incloſing ſome chryſaliſes in a glaſs tube, found, after ſome time, a ſmall quantity of water at the bottom of it; which could have come there no other way, but from the body of the incloſed animal. This tranſpiration depends greatly on the temperature of the air; it is increaſed by heat, and diminiſhed by cold; but it has alſo its peculiarities in regard to the ſeveral ſpecies of butterfly to which the chryſalis belongs. According to theſe obſervations, the time of the duration of the animal in the chryſalis ſtate muſt be, in different ſpecies, very different; and there is indeed this wide difference in the extremes, that ſome ſpecies remain only 8 days in this ſtate, and others 8 months. We know that the caterpillar changes its ſkin 4 or 5 times during its living in that ſtate; and that all theſe ſkins are at firſt produced with it from the egg, lying cloſely over one another. It parts with, or throws off all theſe one by one, as the butterfly, which is the real animal, all this time within, grows more and more perfect in the ſeveral firſt changes. When it throws off one, it appears in another ſkin exactly of the ſame form; but as its final change from this appearance, that is, when it throws off the laſt ſkin, as the creature within is now arrived at ſuch a degree of perfection as to need no farther taking of nouriſhment, there is no farther need of teeth, or any of the other parts of a caterpillar. The creature, in this laſt change, proceeds in the very ſame manner as in all the former, the ſkins opening at the back, and the animal making its way out in this ſhape. If a caterpillar, when about to throw off this laſt ſkin, be thrown into ſpirits of wine, and left there for a few days, the membranes within will harden, and the creature may be afterwards carefully opened, and the chryſalis taken out, in which the form of the tender butterfly may be traced in all its lineaments, and its eyes, legs, &c. evidently ſeen. It is not neceſſary, however, to ſeize upon this exact thing for proving the exiſtence of the chryſalis or butterfly in the caterpillar: for if one of theſe animals be thrown into ſpirit of wine, or into vinegar, ſome days before that time, and left there for the fleſh to harden, it may afterwards be diſſected, and all the lineaments of the butterfly traced out in it; the wings, legs, antennæ, &c. being as evident here, and as large, as in the chryſalis. It is plain from this, that the change of the caterpillar into chryſalis is not the work of a moment; but is carrying on for a long time before, even from the very hatching of the creature from the egg. The parts of the butterfly, however, are not diſpoſed exactly in the ſame manner while in the body of the caterpillar, as when left naked in the form of the chryſalis: for the wings are proportionally longer and narrower, being wound up into the form of a cord; and the antennæ are rolled up on the head; the trunk is alſo twiſted up and laid upon the head; but this in a very different manner from what it is in the perfect animal, and very different from that in which it lies within the chryſalis; ſo that the firſt formation of the butterfly in the caterpillar, by time arrives at a proper change of the diſpoſition of its parts, in order to its being a chryſalis. The very eggs, hereafter to be depoſited by the butterfly, are alſo to be found not only in the chryſalis, but in the caterpillar itſelf, arranged in their natural, regular order. They are indeed in this ſtate very ſmall and tranſparent; but after the change into the chryſalis, they have their proper colour. As ſoon as the ſeveral parts of the butterfly, therefore, are arrived at a ſtate proper for being expoſed to the open air, they are thrown out from the body of the caterpillar ſurrounded only with their membranes; and as ſoon as they arrive at a proper degree of ſtrength and ſolidity, they labour to break through theſe thinner coverings, and to appear in their proper and natural form. The time of their duration in this ſtate of chryſalis is very uncertain, ſome remaining in it only a few days, others ſeveral months, and ſome almoſt a year in appearance. But there is a fallacy in this that many are not aware of. It is natural to think, that as ſoon as the creature has incloſed itſelf in its ſhell, be that of what matter it will, it undergoes its change into the chryſalis ſtate. And this is the caſe with the generality: yet there are ſome which are 8 or 9 months in the ſhell before they become chryſaliſes; ſo that their duration in the real chryſalis ſtate is much ſhorter than it naturally appears to be. M. Reaumur carefully watched the articulated caterpillar of the oak in its ſeveral changes, and particularly from its chryſalis, which is of this laſt kind, into the fly: and has given an account of the method of this as an inſtance of the general courſe of nature in theſe operations. The membranes which envelope the creature in this chryſalis ſtate are at firſt tough and firm, and immediately touch the ſeveral parts of the incloſed animal; but by degrees, as theſe parts harden they become covered, ſome with hairs, and others with ſcales. Theſe, as they continue to grow by degrees fall off the ſeveral particular membranes which cover the parts on which they are placed to a greater diſtance, and gradually looſen then from the limbs. This is one reaſon of thoſe membranes drying and becoming brittle. The middle of the upper part of the CORSELET is uſually marked with a line which runs in a longitudinal direction; and this part is always more elevated than the reſt, even in the conic kinds, which are no otherwiſe angular. This line is in ſome very bold and plain; in others, it is ſo faint as not to be diſtinguiſhable without glaſſes; but it is always in the midſt of that line that the ſhell begins to open. The motion of the head of the butterfly backwards firſt occaſions this crack; and a few repititions of the ſame motion open it the whole length of the line. The clearing itſelf, however, entirely, is a work of more time in this caſe, than is the paſſing of the chryſalis out of the body of the caterpillar. In that caſe there is a crack ſufficiently large in the ſkin of the back, and the whole chryſalis being looſe comes out at once. But in this caſe, every particular limb, and part of the body, has its ſeparate caſe; and theſe are almoſt conceivably thin and tender, yet it is neceſſary that every part be drawn out of them before it appear naked to the open air. As ſoon as all this is effected, and the animal is at full liberty, it either continues ſome time upon the remains of its covering, or creeps a little way diſtant from it, and there reſts. The wings are principally admired in this creature. Theſe are at this time ſo extremely folded up, and placed in ſo narrow a compaſs, that the creature ſeems to have none at all: but they by degrees expand and unfold themſelves; and finally, in a quarter of an hour, or half an hour at the utmoſt, they appear of their full ſize, and in all their beauty. The manner of this ſudden unfolding of the wings is this: the ſmall figure they make when the creature firſt comes out of its membranes, does not prevent the obſerving that they are at that time conſiderably thick. This is owing to its being a large wing folded up in the niceſt manner, and with folds ſo arranged as to be by no means ſenſible to the eye, for the wing is never ſeen to unfold; but, when obſerved in the moſt accurate manner, ſeems to grow under the eye to this extent. When the creature is firſt produced from the ſhell, it is every where moiſt and tender; even its wings have no ſtrength or ſtiffneſs till they expand themſelves; but they then dry by degrees, and, with the other parts, become rigid and firm. But if any accident prevents the wings from expanding at their proper time, that is, as ſoon as the creature is out of its ſhell, they never afterwards are able to extend themſelves; but the creature continues to wear them in their contracted and wholly uſeleſs ſtate; and very often, when the wings are in part extended before ſuch an accident happens, it ſtops them in a partial extenſion, and the creature muſt be contented to paſs its whole life with them in that manner. M. Reaumur has proved, that heat and cold make great differences in the time of hatching the butterfly from its chryſalis ſtate: and this he particularly tried with great accuracy and attention, by putting them in veſſels in warm rooms, and in ice houſes; and it ſeemed wholly owing to the haſtening or retarding the evaporation of the abundant humidity of the animal in the chryſalis ſtate, that it ſooner or later appeared in the butterfly form. He varniſhed over ſome chryſaliſes, to try what would be the effect of thus wholly preventing their tranſpiration; and the conſequence was, that the butterflies came forth from theſe, two months later than their natural time. Thus was the duration of the animal in this ſtate lengthened; that is, its exiſtence was lengthened; but without any advantage to the creature, ſince it was in the time of its ſtate of inaction, and probably of inſenſibility. M. Reaumur deduces a hint from this, reſpecting the preſervation of eggs, that ſeems to be of ſome uſe. See EGGS. The third ſtate of theſe inſects that in which they are winged, is always very ſhort, and ſeems deſtined for no other action but this propagation of the ſpecies. See PAPILIO.

(I.) CHRYSANTHEMUM, CORN MARIGOLD; A genus of the polygamia ſuperflua order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The receptacle is naked; the pappus marginated, or conſiſting only of a border; the calyx hemiſpherical and imbricated, with the marginal ſcales membranaceous. There are 19 ſpecies, of which the following are the moſt remarkable.

1. CHRYSANTHEMUM CORONARIUM hath been long cultivated in the gardens on account of the beauty of its flowers. It grows to the height of three feet, with a ſingle upright ſtalk divided into numerous branches, garniſhed with pinnated leaves, and crowned with elegant compound flowers of different colours and properties. The varieties are, ſingle and double flowers of a cream colour; yellow; yellow and white; brimſtone-coloured; fiſtular, or quilled; or thoſe with finely jagged leaves, and flowers of all the above colours and properties. All the varieties begin flowering in July: the flowers are exceedingly numerous, and exhibit a conſtant ſucceſſion of full bloom till November; and both ſingle and double are ſucceeded by abundance of ſeed. This ſpecies may be raiſed in abundance from ſeed, either in a hot-bed, or warm border, in the ſpring, for tranſplanting; alſo by cuttings and ſlips of their branches in autumn. The latter method is practiſed only for the propagation of the fine doubles, for an early bloom the following ſummer; and the beſt time to perform it is in September, or early in October. Cut off at that time a quantity of the robuſt ſide ſhoots, from 3 to 6 inches long, without flowers; diveſt them of the lower leaves, and plant many of them together in large pots, within an inch or two of the tops, and 2 or 3 inches apart, give ſome water, and place them in the ſhade during the hot weather: by the end of October they will be rooted, when the pots are to be removed either into a green-houſe or garden frame, for the winter; but the latter is the moſt eligible, where they may enjoy the full air in mild weather, and have occaſional ſhelter from froſt. In April they may be tranſplanted ſingly into borders, and ſome in pots. The plants thus raiſed will flower a month or ſix weeks ſooner the ſucceeding ſummer than thoſe raiſed in the ſpring from ſeed; but as they ſoon become barren, it is proper to have always a quantity of plants raiſed from the ſeed. The third ſort may be raiſed either from ſeeds or cuttings, but requires to be ſheltered in the green-houſe in winter.

2. CHRYSANTHEMUM PUTESCENS, a native of the Canary iſlands. It riſes with a ſhrubby ſtalk near two feet high, dividing into many branches, which are garniſhed with pretty thick ſucculent leaves, of a greyiſh colour, cut into many ſegments. The flowers come out from the wings of the leaves, growing upon naked footſtalks ſingly, which greatly reſemble thoſe of chamomile. There is a ſucceſſion of flowers on the ſame plant for the greateſt part of the year, for which it is chiefly eſteemed. This plant will perfect ſeeds in Britain when the ſeaſons are favourable.

3. CHRYSANTHEMUM SEROTINUM is a native of North America. The roots of this plant creep far under the ſurface, and ſend up ſtrong ſtalks more than 4 feet high, garniſhed with long ſawed leaves ending in points. Theſe ſtalks divide upward into many ſmaller; each being terminated by a large, white, radiated flower, which appears in the end of Auguſt or September. This ſpecies multiplies faſt by its creeping roots, and will thrive in any ſoil or ſituation.

(II.) CHRYSANTHEMUM, BASTARD. See SILPHIUM.

(III.) CHRYSANTHEMUM, HARD-SEEDED. See OSTEOSPERMUM.

CHRYSES, in fabulous hiſtory, the prieſt of Apollo, and father of Aſtynome, hence called *Chryſeis*. When Lyrneſſus was taken and the ſpoils divided among the conquerors, Chryſeis fell to the ſhare of Agamemnon. Chryſes upon this went to the Grecian camp to ſolicit his daughter's reſtoration; and when his prayers were fruitleſs, he implored the aid of Apollo, who viſited the Greeks with a plague, and obliged them to reſtore Chryſeis.

CHRYSIPPUS, a Stoic philoſopher, born at Solos in Cicilia, was diſciple to Cleanthus, Zeno's ſucceſſor. He wrote many books, ſeveral of which related to logic. None of the philoſophers ſpoke in ſtronger terms of the fatal *neceſſity* of every thing, nor more pompouſly of the *liberty* of man, than this Stoic. It became a proverb, that if it had not been for Chryſippus, the porch had never been: yet the Stoics complained, as Cicero relates, that he had collected ſo many arguments in favour of the ſceptical hypotheſis, that he could not anſwer them himſelf; and thus had furniſhed Carneades, their antagoniſt, with weapons againſt them. There is an apophthegm of this philoſopher preſerved, which does him honour. Being told that ſome perſons ſpoke ill of him, "It is no matter, (ſaid he,) I will live ſo that they ſhall not be believed."

CHRYSIS, the GOLDEN-FLY, in natural hiſtory: A genus of inſects belonging to the order of hymenoptera. The mouth is armed with jaws, but has no proboſcis; the antennæ are filiform, bent, and conſiſt of 12 articulations; the abdomen is arched, with a ſcale on each ſide; the anus is dentated, and armed with a ſting; the wings lie plain; and the body appears as if gilt. There are ſeveral ſpecies, of which the moſt remarkable is the

CHRYSIS IGNITA, or *flaming chryſis*, beautified with the moſt reſplendent colours. The fore part of its head is green and gold, and the hinder of a lovely azure. The thorax is likewiſe azured over, with a mixture of green, and terminated at its extremity with ſharp points on both ſides. The abdomen is green and gold before, and of a coppery red behind, imitating molten copper highly poliſhed. The whole inſect is dotted on its upper part, which gives it a great reſplendency of colour. The antennæ are black, and legs green intermixed with gold. This ſpecies dwells in holes of walls between the ſtones, and in the mortar that cements them. It is often ſeen iſſuing from ſuch holes, where it neſtles and performs its work. The larvæ, which reſemble thoſe of the waſp, likewiſe inhabit the holes of decayed walls.

CHRYSITRIX, in botany: A genus of the diœcia order, belonging to the polygamia claſs of plants. In the hermaphrodite, the glume is two valved, the corollæ from chaff numerous and briſtly; many ſtamina, one within each chaff; one piſtillum. The male is the hermaphrodite; it has no piſtillum.

CHRYSOBALANUS, COCOA PLUM: A genus of the monogynia order, belonging to the icoſandria claſs of plants: and in the natural method ranking under the 36th order, *Pomaceæ*. The calyx is quinquefid, the petals 5; plum kernel five-furrowed and five-valved. There is only one ſpecies, viz. the

CHRYSOBALANUS ICACO, which is a native of the Bahama iſlands and many other parts of America, but commonly grows near the ſea. It riſes with a ſhrubby ſtalk 8 or 9 feet high, ſending out ſeveral ſide branches, which are covered with a dark brown bark. The flowers are white, and are ſucceeded by plums like damſons; ſome blue, ſome red, and others yellow. The ſtone is ſhaped like a pear, and has 5 longitudinal furrows. The plums have a ſweet luſcious taſte, and are brought to the tables of the inhabitants, by whom they are much eſteemed.

CHRYSOCOLLA. See CHEMISTRY, and the article BORAX, § IV. (N° 2.)

CHRYSOCOMA, GOLDY-LOCKS: A genus of the polygamia æqualis order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The receptacle is naked; the pappus ſimple; the calyx hemiſpherical and imbricated; the ſtyle hardly longer than the florets. There are nine ſpecies, the moſt remarkable of which are, the linoſyris, the coma aurea, and the cornua. Theſe are herbaceous flowering perennials, growing from one to two feet high, ornamented with narrow leaves, and compound floſcular flowers of a yellow colour. They are eaſily propagated by dividing the roots or by cuttings; but the two laſt require to be ſheltered in the green-houſe in winter.

CHRYSOGONUM, in botany: A genus of the polygamia neceſſaria order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The receptacle is paleaceous; the pappus monophyllous, and tridented: the calyx pentaphyllous; the ſeeds wrapped up each in a tetraphyllous calyculus, or little cup.

CHRYSOLACHANON, Beet. See BETA.

CHRYSOLAMPIS. See CHRYSOPAGION.

CHRYSOLARUS, Emanuel, one of thoſe learned men in the 14th century, who brought the Greek literature into the weſt. He was a man of rank; and deſcended from an ancient family, ſaid to have removed with Conſtantine from Rome to Byzantium. He was ſent into Europe by the emperor of the eaſt to implore the aſſiſtance of the Chriſtian princes. He afterwards taught at Florence, Venice, Pavia, and Rome; and died at Conſtantinople, in 1415, aged 47. He wrote a Greek grammar, and ſome other tracts.

(1.) * CHRYSOLITE. *n. ſ.* [from χρυσος, gold, and λιθος, a ſtone.] A precious ſtone of a duſky green, with a caſt of yellow. *Woodward.*—

> If metal, part ſeem'd gold, part ſilver clear:
> If ſtone, carbuncle moſt, or *chryſolite. Milt.*

(2.) CHRYSOLITES, OR YELLOWISH GREEN TOPAZES, are found in the Eaſt Indies, Brazil, Bohemia, Saxony, Spain, in the departments of Cantal, Puy-de-dome, and Allier, in France, and in Derbyſhire in England. Some are alſo found with volcanic lavas, as in the Vevarais, where ſome large lumps have been ſeen of 20 or 30 lb. weight; but it is remarkable, that ſome of theſe chryſolites are partly decompoſed into an argillaceous ſubſtance. All chryſolites, however, are far from being of the ſame kind. The oriental is the ſame with the peridot, and differs only by its green hue from the ſapphires, topazes, and rubies of the ſame denomination. This becomes electric by being rubbed; has a priſmatic form of ſix, or ſometimes of five ſtriated faces; and does not loſe its colour or tranſparency in the fire, which the common chryſolite often does; becoming either opaque, or melting entirely in a ſtrong heat. The inſtant it melts, it emits a phoſphoric light like the baſis of alum and gypſeous ſpar: with borax it produces a thin colourleſs glaſs. Its ſpecific gravity is between 3·600 and 3·700; according to Briſſon it is 2·7821, or 2·6923; and that of the Spaniſh chryſolite 3·0989. The ſubſtance of this precious ſtone is lamellated in the direction of the axis of its primitive form: but the chryſolite from Saxony is foliated in a perpendicular direction to the ſame axis. The chryſolite of the ancients was the ſame gem which is now called *topaz*, and the name of itſelf indicates that it ought to be ſo. Pliny ſays that the colour of the chryſolite is yellow like gold.

(3.) Chryſolites, paſte, are a kind of glaſs made in imitation of natural chryſolites, by mixing 2 ounces of prepared cryſtal with 10 ounces of red-lead, adding 12 grains of crocus martis made with vinegar; and then baking the whole for 24 hours, or longer, in a well luted cucurbit.

CHRYSOMELA, in zoology, a genus of inſects belonging to the order of coleoptera. The antennæ are ſhaped like bracelets, and thicker on the outſide; and neither the breaſt nor the elytra are marginated. There are no leſs than 122 ſpecies enumerated by Linnæus, principally diſtinguiſhed by differences in their colour. They are to be found almoſt every where, in woods, gardens, &c. Their progreſſive motion is ſlow; and ſome when caught emit an oily liquor of a diſagreeable ſmell. The glittering colours with which ſeveral ſpecies of chryſomelæ are adorned, and which ſeem to exhibit the brilliancy of gold and copper, have occaſioned their bearing that pompous name. The larvæ of theſe inſects have in general an oval body, rather oblong and ſoft; on the fore part of which are ſituated ſix feet, which are ſcaly, as is alſo the head. They prey upon the ſubſtance of leaves, rejecting the fibrous part. Thoſe of the leaping chryſomelæ infeſt the cotyledons and tender leaves of plants. Of this genus is that very pernicious inſect called by the country people the turnip fly, which infeſts turnips and many crops in the garden, deſtroying often whole fields while in their ſeedling leaves. In very hot ſummers they abound to an amazing degree, and, in a field or garden, make a pattering like rain, by jumping on the leaves of the turnips or cabbages. See *Plate* LXXIV. *fig.* 10.

CHRYSOMITHRES, in ornithology, the name by which ſome call the gold-finch.

CHRYSOPAGION, in natural hiſtory, a name by which ſome of the middle age writers have called the gem deſcribed by Pliny under the name of the chryſolampis. Salmaſius is of opinion that it was only a foul kind of the chryſopraſius, of which Pliny ſays, that ſome of them were full of ſpecks, and of a variable colour.

CHRYSOPETRON, in natural hiſtory, a name given by Pliny, and others, to the yellower kind of the ancient topaz, that is, our chryſolite.

CHRYSOPHRYS, in ichthyology, a name given by the ancient Greek and Latin authors to a fiſh now called the aurata; a ſpecies of ſparus.

CHRYSOPHYLLUM, the bully tree: A genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 43d order, viz. *Dumoſæ*. The corolla is campanulated, decemfid, with the ſegments alternately a little patent. The fruit is a ten-ſeeded berry. There are two ſpecies, both natives of the Weſt Indies, viz.

1. Chryſophyllum cainito riſes 30 or 40 feet high, with a large trunk covered with a brown bark, and divides into many flexible ſlender branches, which generally hang downward, garniſhed with ſpear ſhaped leaves, whoſe under ſides are of a bright ruſſet colour. The flowers come out at the extremities of the branches, diſpoſed in oblong bunches, which are ſucceeded by fruit of the ſize of a golden pippin, that are very rough to the palate, and aſtringent; but when kept ſome time mellow, as is practiſed here with medlars, they have an agreeable flavour.

2. Chryſophyllum glabrum never riſes to the height of the Cainito, nor do the trunks grow to half the ſize; but the branches are ſlender and garniſhed with leaves like thoſe of the other. The flowers come out in cluſters from the ſides of the branches, which are ſucceeded by oval ſmooth fruit, about the ſize of a bergamot pear. It contains a white clammy juice when freſh; but after being kept a few days, it becomes ſweet, ſoft, and delicious. Incloſed are 4 or 5 black ſeeds of the ſize of a pomkin. Both ſpecies are often preſerved in large ſtoves, and are propagated by ſeeds; but they can never bear the open air in this country.

CHRYSOPILON, in natural hiſtory, a name given by ſome of the ancients to a ſpecies of the beryl; which had a yellowiſh tinge.

CHRYSOPSIS, the golden-eye, in natural hiſtory, the name of a ſpecies of fly, ſo called from the beautiful gold colour of its eyes. It is a long bodied fly, with extremely thin and tranſparent wings of a ſilvery colour, with green ribs or nerves; the body is green, and the antennæ very ſlender and blackiſh. It is a very ſlow flyer, and is common in gardens; it is frequently found on the elder; and has a very ſtrong ſmell.

(1.) * **CHRYSOPRASUS**. *n. ſ.* [χρυσος, gold, and *πρασινος*, green.] A precious ſtone of a yellow colour, approaching to green.—The ninth a topaz, the tenth a *chryſopraſus*. *Rev.*

(2.) Chryſopraſus, or **CHRYSOPRASIUS**, the 10th of the precious ſtones mentioned in the Revelation, as forming the foundation of the heavenly Jeruſalem. The chryſopraſus is by mineralogiſts reckoned to be a variety of the chryſolite, by Cronſtedt called the *yellowiſh green and cloudy topaz*. He ſuppoſes it to be the ſubſtance which ſerves as a matrix to the chryſolite; as thoſe that he had ſeen were like the clear veined quartz, called in Sweden *milk cryſtal*, which is the firſt degree of cryſtallization. According to M. Magellan, it is of a green colour, deeper than the chryſolite, but with a yellowiſh tinge inclining to blue like the green leek. M. Achard ſays that it is never found cryſtallized, and that it is ſemi-tranſparent. By others it is reckoned among the quartz, and its colour is ſuppoſed to be owing to the mixture of cobalt, as it gives a fine blue glaſs when melted with borax, or with fixed alkali. M. Achard, however, found the glaſs of a deep yellow when the fuſion was made with borax; and that it really contains ſome calx of copper inſtead of cobalt. M. Dutens ſays, that ſome gold has been found in this kind of ſtone: but this laſt belongs in all probability, ſays M. Magellan, to another claſs of ſubſtances, viz. the vitreous ſpars: to which alſo belongs moſt probably the aventurine. See Spar. The chryſopraſus only differs from the chryſolite in its bluiſh hue.

CHRYSORRHÆA, the Greek name of the river Abana. See Abana.

CHRYSOPLENIUM, in botany: A genus of the digynia order, belonging to the decandria claſs of plants; and in the natural method ranking under the 13th order, *Succulentæ*. The calyx is quadrifid or quinquefid, and coloured; no corolla; the capſule biroſtrated, unilocular and polyſpermous. Its Engliſh name is *Golden Saxifrage*.

CHRYSOSTOM, St John, a celebrated patriarch of Conſtantinople, and of the moſt admired fathers of the Chriſtian church, was born of a noble family at Antioch, about A. D. 347. He ſtudied rhetoric under Libavius, and philoſophy under Andragathus: after which he ſpent ſome time in ſolitude in the mountains near Antioch; but the auſterities be endured having impaired his health, he returned to Antioch, where he was ordained deacon by Meletius. Flavian, Meletius's ſucceſſor, raiſed him to the office of preſbyter 5 years after; when he diſtinguiſhed himſelf ſo greatly by his eloquence, that he obtained the furname of *Chryſoſtom*, or *Golden mouth*. Nectarius patriarch of Conſtantinople, dying in 399, St Chryſoſtom, whoſe fame was ſpread throughout the whole empire, was unanimouſly elected by both clergy and people. The emperor Arcadius confirmed his election, and cauſed him to leave Antioch privately, where the people were very unwilling to part with him. He was ordained biſhop on the 26th of February 398; when he obtained an order from the emperor againſt the Eunomians and Montaniſts; reformed the abuſes which ſubſiſted among his clergy; retrenched a great part of the expenſes in which his predeceſſors had lived, in order to feed the poor and build hoſpitals; and preached with the utmoſt zeal againſt the pride, luxury, and avarice of the great. But his pious liberty of ſpeech procured him many powerful enemies. He differed with Theophilus of Alexandria, who got him depoſed and baniſhed; but he was ſoon recalled. After this, declaiming againſt the dedication of a ſtatue erected to the empreſs, ſhe baniſhed him to Cucuſus in Armenia, a moſt barren and unhoſpitable place; afterwards, as they were removing him from Petyus, the ſoldiers treated him ſo roughly, that he died in the way, A. D. 407. The beſt edition of his works is that publiſhed at Paris in 1718, by Montfaucon. See Antioch, § 2.

CHRYSOXYLON, in botany, a name given by ſome to the Scytharian, or *Scythicum lignum*, a wood famous for its beautiful yellow colour, and for tingeing the hair yellow. This was one of the many ſubſtances called by the name of thapsum by the ancient Greeks, from its colour; the word *θαψος*, ſignifying a pale yellow, and being applied by theſe authors to every thing that had that colour.

CHRYSTAL. See Crystal.

CHTHONIA, in antiquity, a feſtival kept in honour of Ceres.

CHU, emperor of China. See China, § 12, 13.

(1) **CHUB**. *n. ſ.* [from *cap*, a great head, *Skinner*.] A river fiſh. The chevin.—The *chub* is in prime from Midmay to Candlemas, but beſt in winter. He is full of ſmall bones: he eats wateriſh; not firm but limp and taſteleſs: nevertheleſs he may be ſo dreſſed as to make him very good meat. *Walton's Angler*.

(2.) **Chub**, or chubb, in ichthyology. See Cyprinus. The reſorts of this fiſh are eaſily found; for they are generally holes overſhadowed by trees, and this fiſh will be ſeen floating in ſuch almoſt on the ſurface of the water in a hot day in great numbers. They are but a poor fiſh for the table, and are very full of bones; but they entertain the angler very much, and are eaſily taken. The beſt manner of fiſhing is thus: prepare a very ſtrong rod of a ſufficient length; fix to the hook a graſshopper; keep perfectly out of ſight of the fiſh, and drop in the bait about two feet from the place where a large chub lies; if he does not ſee the angler he very ſeldom fails biting, and is immediately taken; but he is ſo ſtrong a fiſh that he ſhould be taken out carefully, after a great deal of playing, otherwiſe the tackle will be in danger; a beetle, or any large fly, will anſwer the purpoſe of a graſshopper; and if none of them are to be had, the method of fiſhing muſt be altered, and the line be made long enough for fiſhing at the bottom. In March and April this fiſh is to be caught with large red worms; in June and July with flies, ſnails, and cherries; but in Auguſt and September the proper bait is good cheeſe pounded in a mortar, with ſome ſaffron and a little butter; ſome make a paſte of cheeſe and Venice turpentine for the chub in winter, at which ſeaſon this fiſh is better than at any other; the bones are leſs troubleſome in this ſeaſon, and the fleſh is more firm and better taſted; the row is alſo well flavoured in general. The angler muſt keep his bait for this fiſh at the bottom in cold weather, and near the top in hot, and the fiſh will bite eagerly.

CHUBB, Thomas, a noted polemical writer, born at Eaſt Harnham, near Saliſbury, in 1679. He was put apprentice to a glover at Saliſbury, and afterwards entered into partnerſhip with a tallow-chandler. Being a man of ſtrong natural parts, he employed all his leiſure in reading; and though a ſtranger to the learned languages, became tolerably verſed in geography, mathematics, and other branches of ſcience. His favourite ſtudy was divinity; and he formed a little ſociety for the purpoſe of debating on religious ſubjects, about the time that the Trinitarian controverſy was ſo warmly agitated between Clarke and Waterland. This ſubject, therefore, falling under the cognizance of Chubb's theological aſſembly, he drew up his ſentiments on it, in a diſſertation; which was afterwards publiſhed under the title of *The Supremacy of the Father aſſerted*, &c. In this piece Mr Chubb ſhowed great talents in reaſoning; and acquired ſo much reputation, that the late Sir Joſeph Jekyl, took him into his family to enjoy his converſation: but though he is ſaid to have been tempted to remain with him by the offer of a genteel allowance, he did not continue with him many years; but choſe to return to his friends at Saliſbury. He publiſhed afterward a 4to volume of tracts, which Mr Pope informs his friend Gay, he "read through with admiration of the writer, though not always with approbation of his doctrine." He died unmarried in the 68th year of his age, and left behind him 2 vols. of poſthumous tracts, in which he appears to have had little belief in revelation. But however licentious in his way of thinking, nothing immoral has been fairly imputed to his life.

* CHUBBED. *adj.* [from *chub.*] Big-headed like a chub.

* CHUCK. *n. ſ.* [from the verb.] 1. The voice of a hen.—He made the *chuck* four or five times, that people uſe to make to chickens when they call them. *Temple.* 2. A word of endearment, corrupted from chickens or chick.—

> Come, your promiſe.—What promiſe, *chuck?*
> *Shakeſpeare.*

3. A ſudden ſmall noiſe.

(1.) * *To* Chuck. *v. a.* 1. To call as a hen calls her young.—

> Then crowing, clapp'd his wings, th' appointed call,
> To *chuck* his wives together in the hall. *Dryd.*

2. To give a gentle blow under the chin, ſo as to make the mouth ſtrike together.—Come, *chuck* the infant under the chin, force a ſmile, and cry, Ah, the boy takes after his mother's relations. *Congreve.*

(2.) * *To* Chuck. *v. n.* [A word probably formed in imitation of the ſound that it expreſſes; or perhaps corrupted from *chick.*] To make a noiſe like a hen, when ſhe calls her chickens.

* CHUCK FARTHING. *n. ſ.* [*chuck* and *farthing.*] A play at which the money falls with a chuck into the hole beneath.—He loſt his money at *chuck-farthing*, ſhuffle-cap, and all-fours. *Arbuthnot.*

(1.) * *To* CHUCKLE. *v. a.* [from *chuck.*] 1. To call as a hen.—I am not far from the women's apartment, I am ſure; and if theſe birds are within diſtance, here's that will *chuckle* 'em together. *Dryden.* 2. To cocker; to fondle.—Your confeſſor, that parcel of holy guts and garbidge; he muſt *chuckle* you, and moan you. *Dryden.*

(2.) * *To* Chuckle. *v. n.* [*ſchaecken*, Dutch.] To laugh vehemently; to laugh convulſively.—

> What tale ſhall I to my old father tell?
> 'Twill make him *chuckle* thou'rt beſtow'd ſo well. *Dryden.*

(1.) CHUDLEIGH, a town in Devonſhire, ſeated on the Teigne, 9 miles W. of Exeter, and 183 W. by S. of London. It carries on a woollen manufacture, and has a market on Sat. and 3 fairs. Lon. 3. 39. W. Lat. 50. 38. N.

(2.) Chudleigh, Lady Mary, was born in 1656, and married to Sir George Chudleigh, baronet, by whom ſhe had ſeveral children: her poems and eſſays have been much admired for delicacy of ſtyle. She died in 1710; and is ſaid to have written ſeveral dramatic pieces, which, though not printed, are preſerved in the family.

* CHUET. *n. ſ.* [probably from *To chew.*] An old word, as it ſeems, for forced meat.—As for *chuets*, which are likewiſe minced meat, inſtead of butter and fat, it were good to moiſten them partly with cream, or almond or piſtacho milk. *Bacon.*

* CHUFF. *n. ſ.* [A word of uncertain derivation; perhaps corrupted from *chub*, or derived from *kwf*, Welch, a ſtock.] A coarſe, fat-headed, blunt clown.—Hang ye, gorbellied knaves, are you undone? No, ye fat *chuffs*, I would your ſtore were here. *Shak.*—A leſs generous *chuff* than this in the fable, would have hugged his bags to the laſt. *L'Eſtrange.*

* CHUFFILY. *adv.* [from *chuffy.*] Surlily; ſtomachfully.—John anſwered *chuffily. Clariſſa.*

* CHUFFINESS. *n. ſ.* [from *chuffy.*] Clowniſhneſs; ſurlineſs.

* CHUFFY. *adj.* [from *chuff.*] Blunt; ſurly; fat.

(1.) CHUGANSERIAL, a town of Aſia, in the Cabuliſtare, on a river of the ſame name, 80 miles NE. of Cabul. Lon. 70. 8. E. Greenwich. Lat. 34. 55. N.

(2.) CHUGANSERIAL, a river of Aſia, which riſes in the Kuttore country, and runs into the Kameh, near Jalatabad, in Cabuliſtan.

CHUKOTSKIJA, a province of Siberia, and the moſt eaſterly of the Ruſſian dominions, extending from Lon. 174° to 207° E. Ferro, and from Lat. 63° to 73° 20′ N.

CHULMLEIGH, a village in Devonſhire, between Crediton and Barnſtaple.

CHULTA. See Bengal, § 11.

* CHUM. *n. ſ.* [*chom*, Armorick, to live together.] A chamber fellow; a term uſed in the univerſities.

CHUMBIVILEAS, a juriſdiction of South America, in Peru, near 30 leagues in extent; with ſome mines of gold and ſilver. The ſoil is fertile, producing corn and paſture in plenty.

CHUMBULL, a river of Hindooſtan, in the country of Agra, which runs into the Junna, 23 miles SE. of Etaya.

* CHUMP. *n ſ.* A thick heavy piece of wood, leſs than a block.—When one is battered, they can quickly of a *chump* of wood, accommodate themſelves with another. *Moxon.*

CHUNAR, a fort of Hindooſtan Proper, in the province of Allahabad. It is ſeated on the Ganges, 20 miles above Benares, and is built on a rock, which is fortified all round by a wall, and towers at various diſtances. At the end, overlooking the river, is ſituated the citadel, which has formerly been ſtrong. This fort is ſaid to be of the higheſt antiquity, and originally built by the Hindoos. In the citadel is an altar, conſiſting of a plain black marble ſlab, on which the tutelary deity of the place is traditionally ſuppoſed to be ſeated at all times, except from ſun riſe till nine in the morning, when he is at Benares; during which time, from the ſuperſtition of the Hindoos, attacks may be made with a proſpect of ſucceſs. Chunar has always been conſidered as a poſt of great conſequence on the Ganges, from its inſulated ſituation, projecting forward to a great extent, and being of conſiderable height. It was unſucceſsfully attempted by the Engliſh in 1764: the next year, it was ſurrendered to them: they reſtored it to the Nabob of Oude at the ſubſequent peace; but in 1772, it was finally ceded to the Engliſh, by that prince, in exchange for Allahabad. At this place is kept the magazine of ammunition and artillery for the brigade at Cawnpore. It is 385 miles NW. of Calcutta. Lon. 83. 50. E. Lat. 55. 10. N.

CHUNAUB. See Jenaub.

CHUPMESSAHITES, [Turkiſh. *i. e.* protectors of Chriſtians,] a ſect among the Mahometans, who believe that Jeſus Chriſt is God, and the true Meſſiah, the Redeemer of the world; but without rendering him any public worſhip. Ricant ſays, there are many Chupmeſſahites among the people of faſhion in Turkey, and ſome even in the ſeraglio.

(1.) CHUPRAH, a town of Hindooſtan, in the Candeiſh county, 50 miles W. of Burhampour, and 112 SSW. of Iucore.

(2.) Chuprah, a town of Hindooſtan, in the country of Bahar, on the N. coaſt of the Ganges; 25 miles NW. of Parna.

CHUR. See Chuz.

(I. i.) * CHURCH. *n. ſ.* [*circe*, Saxon; *κυριακη*.] 1. The collective body of chriſtians, uſually termed the catholic church.—The *church*, being a ſupernatural ſociety, doth differ from natural ſocieties in this; that the perſons unto whom we aſſociate ourſelves in the one, are men ſimply conſidered as men; but they to whom we be joined in the other, are God, angels, and holy men. *Hooker.* 2. The body of chriſtians adhering to one particular opinion, or form of worſhip.—The *church* is a religious aſſembly, or the large fair building where they meet; and ſometimes the ſame word means a ſynod of biſhops, or preſbyters; and in ſome places it is the pope and a general council. *Watt.* 3. The place which chriſtians conſecrate to the worſhip of God.—It comprehends the whole *church*, viz. the name or body of the *church*, together with the chancel, which is even included under the word *church*. *Ayliffe's Parergon.*—That *churches* were conſecrated unto none but the Lord only, the very general name chiefly doth ſufficiently ſhew: *church* doth ſignify no other thing than the Lord's houſe. *Hooker.* 4. It is uſed frequently in conjunction with other words; as *church-member*, the member of a church; *church-power*, ſpiritual or eccleſiaſtical authority.

(ii.) Church, (§ 1. *def.* 1.) in its moſt enlarged ſenſe, comprehends all who profeſs to believe in Chriſt, and acknowledge him to be the Saviour of mankind. This is what the ancient writers call the *catholic* or *univerſal church*. Sometimes the church is divided into ſeveral branches; as the church militant, the aſſembly of the faithful on earth; the church triumphant, that of the faithful already in glory; to which the Papiſts add the church patient; which, according to their doctrines, is that of the faithful in purgatory.

(iii.) Church, in a more reſtricted ſenſe, is applied to any particular congregation of Chriſtians, who aſſociate together and concur in the participation of all the inſtitutions of Jeſus Chriſt, with their proper paſtors and miniſters. Thus we read of the church of Antioch, the church of Alexandria, the church of Theſſalonica, and the like. The primitive churches, at leaſt in the apoſtolic age, appear to have been ſo many ſeparate congregations of Chriſtians, totally independent of each other, and acknowledging no ſuperior authority but that of the apoſtles.

(iv.) Church, (as defined, § I. *def.* 2.) is applied to many different parties of Chriſtians, who entertain different opinions in religion, and are moſtly diſtinguiſhed by their reſpective countries: ſuch as

(1.) Church, Gallican, denotes the ci-devant church of France, under the government of its reſpective biſhops and paſtors. This church always enjoyed certain franchiſes and immunities; not as grants from popes, but as derived to her from her firſt original, and which ſhe took care never to relinquiſh. Theſe liberties depended upon two maxims; the firſt that the pope had no right to order any thing, in which the temporalities and civil rights of the kingdom were concerned; the 2d, that notwithſtanding the pope's ſupremacy was admitted in caſes purely ſpiritual, yet in France his power was limited by the decrees of ancient councils received in that realm. From the revolution till the beginning of 1802, France may be ſaid to have been without a church; but in the end of 1801, a convention was entered into between his holineſs, the Pope, (Pious VII,) and in March, 1802, the catholic religion was again eſtabliſhed, with a toleration of the Proteſtants, under ſome reſtrictions.

(2.) Church, Greek, or Eastern, comprehends the churches of all the countries anciently ſubject to the Greek or eaſtern empire, and through which their language was carried: that is, all the ſpace extending from Greece to Meſopotamia and Perſia, and thence into Egypt. This church has been divided from the Roman, ever ſince the time of the emperor Phocas.

(3.) Church, high. See High-church.

(4.) Church, Latin, or Western, comprehends all the churches of Italy, Portugal, Spain, Africa, the north, and all other countries whither the Romans carried their language. Great Britain, part of the Netherlands of Germany, and of the North of Europe, have been ſeparated from it almoſt ever ſince the reformation.

(5.) Church of England, the epiſcopal church eſtabliſhed by law in that kingdom, which has exiſted ever ſince the time of Henry VIII. (who, after being *Defender of the* Roman Catholic *Faith*, became its *oppoſer*;) with the exception of his daughter Mary's reign. Its doctrines are chiefly Lutheran, and its form of government hierarchical.

(6.) Church of Rome, or the Roman Catholic Church, claims the title of being the *Mother* church, and is undoubtedly the moſt ancient of all the eſtabliſhed churches in Chriſtendom, if antiquity be held as a proof of primitive purity, See § 4.

(7.) Church of Scotland, the preſbyterian church, eſtabliſhed by law in that kingdom, which has exiſted, (with ſome interruptions during the reigns of the Stewarts,) ever ſince the time of John Knox, when the voice of the people prevailed againſt the influence of the crown, in getting it eſtabliſhed. Its doctrines are Calviniſtic, and its form of government republican.

(8.) Church, reformed, comprehends the whole proteſtant churches in Europe and America, whether Lutheran, Calviniſtic, Independent, Quaker, Baptiſt, or of any other denomination, who diſſent from the church of Rome.

(v.) Church is alſo uſed to ſignify the body of eccleſiaſtics, or the clergy, in contradiſtinction to the laity. See Clergy.

(vi. 1.) Church, (as above defined, § 3,) is variouſly denominated, according to its rank, degree, diſcipline, &c. as Metropolitan, Patriarchal, Cathedral, Parochial, Collegiate church, &c. See METROPOLIS, PATRIARCHAL, &c.

(2.) CHURCH, GRAND, an expreſſion uſed by eccleſiaſtical writers, for the chief church of a place; particularly in the Greek liturgy, for the church of St Sophia at Conſtantinople, the ſee of the patriarch, founded by Conſtantine, and conſecrated under Juſtinian. It was at that time ſo magnificent, that Juſtinian is ſaid to have cried out in the conſecration thereof, Ενικησα σε Σολομων, *I have out done thee, Solomon.* The dome, which is ſaid to have been the firſt that was built, is 330 feet diameter. The firſt church publicly built by the Chriſtians, ſome authors maintain to be that of St Saviour at Rome, founded by Conſtantine; others contend, that ſeveral churches abroad, called by the name of *St Peter Vivus*, were built in honour of that apoſtle during his life time.

(vii.) CHURCH, in architecture, (§ 1. *def.* 3.) is defined by Daviler, a large oblong edifice, in form of a ſhip, with nave, choir, iſles, belfry &c. See theſe articles. The form of the ancient Greek churches, when complete, was as follows: firſt was a porch, or portico, called προναος the *vduntnave*, this was adorned with columns on the outſide, and on the inſide ſurrounded with a wall; in the middle whereof was a door, through which they paſſed into a 2d portico. The firſt of theſe porticoes was deſtined for the ENERGUMENI, and penitents in the firſt ſtage of their repentance; the 2d was much longer, deſtined for penitents of the 2d claſs, and the catechumens, and hence called ναρθηξ, *ferula*, becauſe thoſe placed in it began to be ſubject to the diſcipline of the church. Theſe two porticoes took up about one third of the ſpace of the church. From the 2d portico, they paſſed into ναος, the nave, which took up near another third of the church. In the middle, or at one ſide of the nave, was the AMBO, where the deacons and prieſts read the goſpel, and preached. The nave was deſtined for the reception of the people, who here aſſiſted at prayers. Near the entrance of this was the baptiſtery or font. Beyond the nave was the choir, χορος, ſet with ſeats, and round: the firſt ſeat on the right, next the ſanctuary, being for the CHORAGUS, or chanter. From the choir they aſcended by ſteps to the ſanctuary, which was entered at three doors. The ſanctuary had 3 apſides in its length; a great one in the middle, under which was the altar, crowned with a baldachin, ſupported by 4 columns. Under each of the ſmall apſides, was a table or cupboard, in manner of a beaufet. Of the Greek churches now remaining, few have all the parts, above deſcribed, moſt of them having been reduced to ruins or converted into moſques. Churches are variouſly diſtinguiſhed by builders:

(1.) CHURCH IN A GREEK CROSS, that where the length of the traverſe part is equal to that of the nave; ſo called becauſe moſt of the Greek churches are built in this form.

(2.) CHURCH IN A LATIN CROSS, that whoſe nave is longer than the croſs part, as in moſt of the Gothic churches.

(3.) CHURCH IN ROTUNDO, that whoſe plan is a perfect circle, in imitation of the Pantheon.

(4.) CHURCH, SIMPLE, is that which has only a nave and a choir.

(5.) CHURCH WITH ISLES, that which has a row of porticoes, in form of vaulted galleries, with chapels in its circumference.

(II.) CHURCH, in geography, a village in Lancaſhire, NE. of Blackburn.

* *To* CHURCH. *v. a.* [from the noun.] To perform with any one the office of returning thanks in the church, after any ſignal deliverance, as from the danger of childbirth.

* CHURCH-ALE. *n. ſ.* [from *church* and *ale.*] A wake, or feaſt, commemoratory of the dedication of the church.—For the *church-ale*, two young men of the pariſh are yearly choſen to be wardens, who make collection among the pariſhioners of what proviſion it pleaſeth them to beſtow. *Carew.*

CHURCHAM, a town 5 miles NW. of Glouceſter.

* CHURCH-ATTIRE. *n. ſ.* The habit in which men officiate at divine ſervice.—Theſe and ſuch like were their diſcourſes, touching that *church-attire*, which with us for the moſt part is uſed in publick prayer. *Hooker.*

* CHURCH-AUTHORITY. *n. ſ.* Eccleſiaſtical power; ſpiritual juriſdiction.—In this point of *church-authority*, I have ſifted all the little ſcraps alleged. *Atterbury.*

* CHURCH-BURIAL. *n. ſ.* Burial according to the rites of the church.—The biſhop has the care of ſeeing that all the chriſtians, after their deaths, be not denied *church-burial*, according to the uſage and cuſtom of the place. *Ayliffe.*

CHURCH-DOWN, a village between Glouceſter and Cheltenham.

CHURCH-END, the name of 4 villages in Glouceſterſhire, in the pariſhes of Nibley, Slimbridge, Tiddenham, and Twining.

CHURCHESSET. See CHURCH-SCOT.

* CHURCH-FOUNDER. *n. ſ.* He that builds or endows a church.—Whether emperors or biſhops in thoſe days were *church-founders*, the ſolemn dedication of churches they thought not to be a work in itſelf either vain or ſuperſtitious. *Hooker.*

CHURCH-HEATH, a town SE. of Cheſter.

(1.) CHURCH-HILL, a village of the United States, in the Eaſtern Shore of Maryland, ſeated in Queen Anne's county, on the N. ſide of South-Eaſt creek; 7 miles SE. by E. of Cheſter, and 85 SW. of Philadelphia: from which it lies in Lon. 0. 55. W. Lat. 39. 9. N.

(2—4.) CHURCH-HILL, the name of 3 towns in England, viz. 1. in Oxfordſh. near Norton: 2. N. of Kidderminſter: and, 3. SE. of Worceſter, near Hagley, both in Worceſterſhire.

(5.) CHURCH-HILL, in Fermanagh, Ireland.

CHURCH-HOLM, on the Dan, Cheſhire.

CHURCH-HONEYBORN, a village in Worceſterſhire, 4 m. E. of Eveſham.

(1.) CHURCHILL, Charles, a celebrated ſatiriſt, the ſon of Mr Charles Churchill curate and lecturer of St John's Weſtminſter, was educated at Weſtminſter ſchool, and received ſome applauſe for his abilities from his tutors. His capacity, however, was greater than his application, ſo that he acquired the character of a boy that could do good if he would. Having one day got an exerciſe to make, and having failed to bring it at the time appointed, his maſter chaſtiſed him with ſome ſeverity, and even reproached his ſtupidity; but he brought it the next day, finiſhed in ſuch a manner, that he received the public thanks of all the maſters. Still, however, his progreſs in the learned languages was but ſlow; nor is it to be wondered at, if we conſider how difficult it was for a ſtrong imagination, to walk tamely forward in the trammels of a ſchool education. In ſhort, for want of proper ſkill in theſe languages, he was rejected from Oxford, whither his father had ſent him; and probably this occaſioned the frequent invectives we find in his works againſt that univerſity. Upon his return from thence, he again applied to his ſtudies in Weſtminſter ſchool, where, at 17 years of age, he contracted an intimacy with a lady, to whom he was married, and their mutual regard continued for ſeveral years. Mr Churchill obtained a ſmall curacy of L. 30 a-year, in Wales, whither he carried his wife; and he paſſed through the duties of his ſtation with aſſiduity and cheerfulneſs. Happy had it been for him had he continued there to enjoy the fruits of piety, peace, and ſimplicity of manners. He was beloved and eſteemed by his pariſhioners; and tho' his ſermons were rather above the level of his audience, they were commended and followed. But endeavouring to better his circumſtances, by keeping a cyder cellar, it involved him in difficulties which obliged him to leave Wales and come to London. His father dying ſoon after, he ſucceeded him; and, to improve his income, which ſcarcely produced L. 100 a-year, he taught young ladies to read and write Engliſh at a boarding ſchool, where he behaved with that decency and decorum which became his profeſſion. His method of living, however, bearing no proportion to his income, he contracted ſeveral debts in the city; which being unable to pay, a jail, the terror of indigent genius, ſeemed ready to complete his miſfortunes: when he was relieved by the benevolence of Mr Lloyd, father to the poet of that name. Mean while, Mr Lloyd, the ſon, wrote a poetical epiſtle called the *Actor*; which was much approved by the public. This induced Mr Churchill to write the *Roſciad*. It firſt came out without the author's name: but the juſtneſs of the remarks, and the ſeverity of the ſatire, ſoon excited public curioſity. Though he never diſowned his having written this piece, and even openly gloried in it; yet the public, unwilling to give ſo much merit to one alone, aſcribed it to a number of wits: nor were Meſſrs Lloyd, Thornton, or Colman, left unnamed upon this occaſion. This miſplaced praiſe ſoon induced Mr Churchill to throw off the maſk and the ſecond edition appeared with his name at full length. As the Roſciad was the firſt of this poet's performances, ſo many are of opinion that it is the beſt. In it we find a very cloſe and minute diſcuſſion of the particular merit of each performer; their defects pointed out with candour, and their merits praiſed without adulation. This poem, however, ſeems to be one of thoſe few works which are injured by ſucceeding editions: when he became popular, his judgment began to grow drunk with applauſe; and we find, in the latter editions, men blamed whoſe merit is inconteſtable, and others praiſed that were at that time in no degree of eſteem with the judicious. His next performance was his *Apology to the Critical Reviewers*. This work is not without its peculiar merit; and as it was written againſt a ſet of critics whom the world was willing enough to blame, the public read it with their uſual indulgence. In this performance he ſhowed a particular happineſs of throwing his thoughts, if we may ſo expreſs it, into poetical paragraphs; ſo that the ſentence ſwells to the break or concluſion, as we find in proſe. But while his writings amuſed the public, his actions diſguſted it. He now quitted his wife, with whom he had cohabited many years; and reſigning his gown and all clerical functions, commenced a complete *man of the town*, got drunk, frequented ſtews; and, giddy with falſe praiſe, thought his talents a ſufficient atonement for all his follies. To palliate this abſurd conduct, he undertook a poem called *Night*, written upon a general ſubject, but upon this falſe principle, that whatever our follies are, we ſhould never attempt to conceal them. This, and Mr Churchill's other poems, being ſhewn to Dr Johnſon, and his opinion being aſked, he allowed them but little merit; which being told to the author, he reſolved to requite this private opinion with a public one. In his next poem, therefore, of the *Ghoſt*, he has drawn this gentleman under the character of Pompoſo; and thoſe who diſliked the Doctor, allowed it to have merit. Dr Johnſon's only reply was, "that he thought him a ſhallow fellow in the beginning, and could ſay nothing worſe of him ſtill." The poem of Night and the Ghoſt had not the rapid ſale the author expected; but his *Prophecy of Famine* ſoon made ample amends for the late paroxyſm in his fame. In this piece, written in the ſpirit of the famous North Briton, he exerted his virulent pen againſt the whole Scotch nation; adopting the prejudices of the mob, and dignifying ſcurrility by the aid of a poetical imagination. It had a rapid and extenſive ſale, as propheſied by Mr Wilkes; who ſaid, before its publication, that he was ſure it muſt take, as it was at once perſonal, poetical, and political. After its appearance, it was aſſerted by his admirers, that Mr Churchill was a better poet than Pope. This exaggerated adulation began now to impair his mind: ſeveral ſucceeding pieces were publiſhed, which, being written without effort, were read without pleaſure. His *Gotham*, *Independence*, *The Times*, ſeem merely to have been written by a man who deſired to avail himſelf of the avidity of the public curioſity in his favour, and rather to have been aimed at the pockets than the hearts of his readers.—Mr Churchill died in 1764, of a miliary fever, with which he was ſeized at Boulogne in France, whither he had gone on a viſit to Mr Wilkes. After his death his poems were collected and printed together in two volumes 8vo.

(2.) CHURCHILL, John, duke of Marlborough, a moſt renowned general and ſtateſman, was born at Aſhe in Devonſhire in 1650. He was eldeſt ſon of Sir Winſton (N° 3.) who carried him to court while very young, where he was particularly favoured by the duke of York, afterwards king James II. when only 12 years of age. In 1666, he was made an enſign of the guards during the firſt Dutch war; and afterwards improved himſelf greatly in the military art at Tangier. In 1672, he attended the duke of Monmouth, then in the French ſervice, and was ſoon after made a captain in the duke's regiment. At the ſiege of Nimeguen, which happened in that campaign, he diſtinguiſhed himſelf ſo much, that he was taken notice of by Marſhal Turenne, who called him the *handſome Engliſhman.*—In 1673, he was at the ſiege of Maeſtricht, where he gained ſuch applauſe, that the king of France made him a public acknowledgment, and the duke of Monmouth, told king Charles II. that he owed his life to Mr Churchill's bravery. In 1681, he married Sarah daughter of Richard Jennings Eſq; of Sandrich. The duke of York recommended him to the king, who in 1682, created him baron of Eymouth in the county of Berwick in Scotland; and made him colonel of the third troop of guards. A little after king James's acceſſion, he was created baron Churchill of Sandrich in Hertfordſhire, and made a brigadier general of the army in the weſt, where, when the duke of Monmouth came to ſurpriſe the king's army, while the majority of the officers were in their beds, he kept the enemy in play, till the king's forces had formed themſelves, and thereby ſaved the whole army. When James ſhowed his intention of eſtabliſhing the catholic religion in Britain, lord Churchill, notwithſtanding the great obligations he owed him, thought it his duty to abandon the royal cauſe; but even then did not leave him without acquainting him by letter with the reaſon of his ſo doing. Lord Churchill was graciouſly received by the prince of Orange; and was by him employed to re-aſſemble the troop of guards at London, and to new-model the army; for which purpoſe he was appointed lieutenant general. In 1689, he was ſworn one of the privy council, and created earl of Marlborough. He aſſiſted at the coronation, and was ſoon after made commander in chief of the forces ſent over to Holland, where he laid the foundation of his fame. In 1690, he was made general of the forces ſent to Ireland; where he made the ſtrong garriſons of Cork and Kinſale priſoners of war. In 1691, king William ſhowed his good opinion of his conduct, by ſending him to Flanders to put all things in readineſs, and to draw the army together againſt his arrival. In 1692, he was diſmiſſed from all his employments; and, not long after, was, with ſome other peers, committed to the tower on an accuſation of high treaſon; which, however, was afterwards found to be a falſe and malicious report, the authors of which were puniſhed. He was ſoon reſtored to favour, and in 1698 was appointed governor to the earl of Glouceſter; with this compliment from king William, " My lord, make him but what you are, and my nephew will be all I wiſh to ſee him." In July following he was declared one of the lords juſtices, for the adminiſtration of the government, in which great truſt he was three times ſucceſſively in the king's abſence. In 1701, he was appointed general of the foot, commander in chief of the Engliſh forces, and ambaſſador extraordinary and plenipotentiary at the Hague. Upon the acceſſion of queen Anne, he was created a knight of the garter, declared captain general of all her majeſty's forces, and firſt ambaſſador extraordinary and plenipotentiary to Holland. After ſeveral conferences about a war, he put himſelf at the head of the army, where all the other generals had orders to obey him. His exploits in the field will be found under the article ENGLAND, HISTORY OF: we ſhall therefore only take notice in this place, of the rewards and honours conferred upon him for theſe exploits. After his firſt campaign he was created marquis of Blandford and duke of Marlborough, with a penſion of L. 5000 out of the poſt-office, to devolve *for ever* upon thoſe enjoying the title of *Duke of Marlborough*. In 1703, he met Charles III. late emperor, going to Spain, who preſented him with a ſword ſet with diamonds. In 1704, having forced the enemy's lines at Schellenberg, he received a letter of thanks from the emperor Leopold, written with his own hand; an honour ſeldom done to any but ſovereign princes. After the battle of Blenheim, he received congratulatory letters from moſt of the potentates in Europe, particularly from the States General, and the emperor, who deſired him to accept of the dignity of a prince of the empire, which with the queen's leave was conferred upon him by the title of *Prince of Mildenheim in the province of Swabia*. After the campaign, he viſited the court of Pruſſia, where he laid ſuch ſchemes as ſuſpended the diſputes with the Dutch about king William's eſtate; which wiſe conduct cauſed the whole confederacy to acknowledge that he had done the greateſt ſervice poſſible to the common cauſe. Upon his return to England, the queen, to perpetuate his memory, granted the intereſt of the crown in the honour and manor of Woodſtock and hundred of Wotton to him and his heirs for ever. In 1705 he made a tour to Vienna, upon an invitation of the emperor Joſeph; who highly careſſed him, and made him a grant of the lordſhip of Mildenheim. After the campaign of 1708, the ſpeaker of the houſe of commons was ſent to Bruſſels on purpoſe to compliment him; and on his return to England he was again complimented in the houſe of lords by lord chancellor Cowper. All his ſervices, however, and all the honours conferred upon him, were not ſufficient to preſerve him from being diſgraced. After the change of the miniſtry in 1710, his intereſt daily declined; and in 1712, on the firſt day of the new year, he was removed from all his places. Finding all arts uſed to render him obnoxious in his native country, he viſited his principality of Mildenheim, and ſeveral towns in Germany; after which he returned to England, and arrived there on the day of the queen's death. After being welcomed by the nobility and foreign miniſters, he attended king George I. in his public entry through London, who appointed him captain general, colonel of the firſt regiment of foot guards, one of the commiſſioners for the government of Chelſea hoſpital, and maſter general of the ordnance. Some years before his death, he retired from public buſineſs. He died at Windſor lodge in 1722, aged 73; leaving behind him a very numerous poſterity, allied to the greateſt families in theſe kingdoms. Upon his demiſe all parties united in doing honour or rather juſtice to his merit, and his corpſe was interred the 9th of Auguſt following, with all ſolemnity due to a perſon who had deſerved ſo highly of his country, in Weſtminſter abbey. The noble pile near Wood-ſtock, which bears the name of Blenheim-houſe, may be juſtly ſtyled his monument; but his glory will long ſurvive that ſtructure; and ſo long as our hiſtories remain, or indeed the hiſtories of Europe, his memory will live and be the boaſt of Britain, which by his labours was raiſed to be the firſt of nations, as during the age in which he lived he was deſervedly eſteemed the firſt of men. If he had foibles, as theſe are inſeparable from human nature, they were ſo hidden by the glare of his virtues as to be ſcarcely perceived or were willingly forgotten. A certain paraſite, who thought to pleaſe Lord Bolingbroke by ridiculing the avarice of the Duke, was ſtopt ſhort by his Lordſhip; who ſaid, "He was ſo very great a man, that I forgot he had that vice." One of the firſt things which he did, when very young, was to purchaſe a box to put his money in; an indication this of the economical, not to ſay avaricious, temper that accompanied him through life. Dr J. Warton relates, that, on the evening of an important battle, the duke was heard to chide his ſervant for having been ſo extravagant as to light 4 candles in his tent when Prince Eugene came to confer with him. Mr Tyers, mentions a circumſtance which, if well founded, redounds to his generoſity; viz. that during the rebellion 1715 he ſent L. 10,000 to the earl of Mar. We conſider the ſtory as only a traditional report, which has not in itſelf any great degree of probability; and therefore we are by no means convinced of its truth. The late Mr Richardſon junior, the painter, has recorded a pleaſing inſtance of the duke's calmneſs of diſpoſition; for which, indeed, he was always remarkable. "The duke of Marlborough (ſays the writer,) riding out once with commiſſary Marriot, near the commiſſary's houſe in the country, it began to rain, and the duke called for his cloak; Marriot having his put on by his ſervant immediately. The duke's ſervant not bringing the cloak, he called for it again; but the man was ſtill puzzling about the ſtraps and buckles. At laſt, it raining now very hard, the duke called again, and aſked him, 'what he was about that he did not bring his cloak?' 'You muſt ſtay (grumbles the fellow,) if it rains cats and dogs, till I can get at it.' The duke only turned to Marriot, and ſaid, 'I would not be of that fellow's temper." Dr Swift, in one of his letters to Stella, relates the following particulars concerning the duke of Marlborough. "I was early this morning with ſecretary St John, and gave him a memorial to get the queen's letter for the firſt fruits, who has promiſed to do it in a very few days. He told me, 'he had been with the duke of Marlborough, who was lamenting his former wrong ſteps in joining with the Whigs, and ſaid he was worn out with age, fatigue, and misfortunes.' I ſwear it pitied me; and I really think they will not do well in too much mortifying that man, although indeed it is his own fault. He is covetous as hell, and ambitious as the prince of it: He would fain have been general for life, and has broken all endeavours for peace, to keep his greatneſs, and get money. He told the queen, 'he was neither covetous nor ambitious.' She ſaid, 'if ſhe could have conveniently turned about, ſhe would have laughed, and could hardly forbear it in his face.' He fell in with all the abominable meaſures of the late miniſtry, becauſe they gratified him for their own deſigns. Yet he has been a ſucceſsful general, and I hope he will continue his command." But the character given of him by Dr Swift, in his *Hiſtory of the four laſt years of the queen*, has all the malignity and meanneſs of a party pamphlet. It is even ſo fooliſh as to inſinuate, that the duke's military accompliſhments were problematical, and that he was deſtitute of perſonal courage. Mr Macpherſon has done juſtice to his proſecution of the war in Flanders, and hath ſhown that he conducted it upon the principles of ſound wiſdom and good policy. Lord Bolingbroke in his letters on the Study and Uſe of Hiſtory, obſerves with equal juſtice, that the duke "a new, a private man, a ſubject, acquired, by merit and by management, a more deciding influence than high birth, confirmed authority, and even the crown of Great Britain, had given to king William. Not only the parts of that vaſt machine, the grand alliance, were kept more compact and entire, but a more rapid and vigorous motion was given to the whole: and, inſtead of languiſhing out diſaſtrous campaigns, we ſaw every ſcene of the war full of action. All thoſe wherein he appeared, and many of thoſe wherein he was not then an actor, but abettor however of their action, were crowned with the moſt triumphant ſucceſs." Lord Cheſterfield's encomium, in his *Letters to his Son*, is of a different kind: "Of all the men (ſays his lordſhip) that ever I knew in my life (and I knew him extremely well,) the late duke of Marlborough poſſeſſed the graces in the higheſt degree, not to ſay engroſſed them: and indeed he got the moſt by them; for I will venture (contrary to the cuſtom of profound hiſtorians, who always aſſign deep cauſes for great events) to aſcribe the better half of the duke of Marlborough's greatneſs and riches to thoſe graces. He was eminently illiterate; wrote bad Engliſh, and ſpelled it ſtill worſe. He had no ſhare of what is commonly called *parts*; that is, he had no brightneſs, nothing ſhining in his genius. He had moſt undoubtedly, an excellent good plain underſtanding, with ſound judgment. But theſe alone would probably have raiſed him but ſomething higher than they found him; which was page to king James II.'s queen. There the graces protected and promoted him: for while he was an enſign of the guards, the ducheſs of Cleveland, that favourite miſtreſs to king Charles II. ſtruck by thoſe very graces, gave him L. 5000; with which he immediately bought an annuity for his life of L. 500 a-year, of my grandfather Halifax; which was the foundation of his ſubſequent fortune. His figure was beautiful; but his manner was irreſiſtible, by either man or woman. It was by this engaging graceful manner that he was enabled during all his war, to connect the various and jarring powers of the grand alliance, and to carry them on to the main object of the war, notwithſtanding their private and ſeparate views, jealouſies, and wrongheadedneſſes. Whatever court he went to (and he was often obliged to go himſelf to ſome teſty and refractory ones,) he as conſtantly prevailed, and brought them into his meaſures. The penſionary Heinſius, a venerable old miniſter, grown grey in buſineſs, and who had governed the republic of the United Provinces for more than 40 years, was abſolutely governed by the duke of Marlborough, as that republic feels to this day. He was always cool; and nobody ever obſerved the leaſt variation in his countenance: he could refuſe more gracefully than other people could grant; and thoſe who went away from him the moſt diſſatisfied as to the ſubſtance of their buſineſs, were yet perſonally charmed with him, and in ſome degree comforted by his manner. With all his gentleneſs and gracefulneſs, no man living was more conſcious of his ſituation, nor maintained his dignity better." The above paſſage may convince us of the frivolous turn of the earl of Cheſterfield's mind. His lordſhip, in his zeal to exalt the duke of Marlborough's external accompliſhments, either forgets or depreciates the far greater talents of which he was poſſeſſed. That the uncommon gracefulneſs of his manner facilitated his advancement, and contributed to the ſucceſs of his negotiations, may readily be admitted; but ſurely it muſt have been to much higher qualities that he owed his reputation throughout all Europe, and his many victories and conqueſts. It was not by a polite exterior, that he obtained his laurels at Schellenberg, at Oudenarde, Ramillies, and at Blenheim.

(3.) Churchill, Sir Winſton, the father of the great duke of Marlborough, (N° 2.) was deſcended from an ancient family in Dorſetſhire. He was born at Wotton Glanvile in 1610; and educated at St John's college, Oxford. He engaged in the royal cauſe, for which he ſuffered ſeverely in his fortune; and having married, while young, Elizabeth, the daughter of Sir John Drake, they took refuge in her father's houſe, where moſt of his children were born. After the reſtoration, he was elected M. P. for Weymouth; and, in 1669, he was knighted. Next year he was made one of the commiſſioners of claims in Ireland; and upon his return, was conſtituted one of the clerks of the green-cloth: but writing a kind of political *eſſay upon the Hiſtory of England*, which gave great offence to the parliament, he was, in 1678, diſmiſſed from his poſt. He was, however, ſoon reſtored, and lived to ſee his ſon John (N° 2.) raiſed to the peerage, and the reſt of his children in a fair way to promotion. He died in 1688.

(4.) Churchill, a river of N. America, in Labrador, which after running an E. and then a northerly courſe, falls into Hudſon's Bay.

(5, 6.) Churchill, the name of two villages: 1. in Somerſetſhire, SW. of Wrington: 2. in Worceſterſhire near Bredicot.

(7.) Churchill fort, on the E. ſide of Hudſon's Bay, in N. America, the moſt northerly of thoſe belonging to that company. Lon. 94. 3. W. Lat. 58. 48. N.

CHURCHINGFORD, a village in Devonſhire, which has 3 fairs; Jan. 25, and laſt Frid. of March and April.

CHURCHING of women after childbirth, (See *To* Church,) took its riſe from the Jewiſh rite of purification. In the Greek church it was limited to the 40th day after delivery; but in the weſtern parts of Europe no certain time is obſerved. There is an office in the liturgy for this purpoſe.

CHURCHLAND, a village of Ireland, in the county of Kilkenny, Leinſter.

CHURCH-LANGTON, a town of England, near Market Harborough, Leiceſterſhire.

* CHURCHMAN. *n. ſ.* [*church* and *man*.] 1. An eccleſiaſtick; a clergyman; one that miniſters in ſacred things.—If any thing be offered to you touching the church and *churchmen*, or church-government, rely not only upon yourſelf. *Bacon.* —A very difficult work to do, to reform and reduce a church into order, that had been ſo long neglected, and that was ſo ill filled by many weak and more wilful *churchmen*. *Clarendon.* 2. An adherent to the church of England.

CHURCH-OVER, a village in Warwickſhire, oppoſite to Cheſter Over.

Church reeves, the ſame with Church Wardens.

Church-scot, or Churchesset, a payment or contribution, by the Latin writers frequently called *primitiæ ſeminum*; being, at firſt, a certain meaſure of wheat, paid to the prieſt on St Martin's day, as the firſt fruits of harveſt. This was enjoined by the laws of king Malcolm IV. and Canute, c. 10. But after this, it came to ſignify a reſerve of corn rent paid to the ſecular prieſts, or to the religious; and ſometimes was taken in ſo general a ſenſe as to include poultry, or any other proviſion that was paid in kind to the religious. See Tithe.

Church-stanway, a town in Glouceſterſhire.

Church-stempton, near Chard, Devonſhire.

Church-stretton, a town of Shropſhire, with a market on Thurſday. It is 14 miles S. of Shrewſbury. Lon. 2. 46. W. Lat. 52. 32. N.

(1.) CHURCHTOWN, a village of Pennſylvania, in the NE. corner of Lancaſter county. There are two forges near it, wherein about 450 tons of bar iron are annually manufactured. It is 20 miles ENE. of Lancaſter, and 50 WNW. of Philadelphia; from which it lies in Lon. 0. 49. W. Lat. 40. 9. N.

(2—5.) Churchtown the name of 4 towns in Ireland: viz. 1. in Cork, Munſter: 2. in Derry, Ulſter: 3. in Meath, Leinſter: and, 4. in Waterford, Munſter.

(1.) * Church-wardens. *n. ſ.* [See Warden.] Officers yearly choſen, by the conſent of the miniſter and pariſhioners, according to the cuſtom of each place, to look to the church, church-yard, and ſuch things as belong to both; and to obſerve the behaviour of the pariſhioners, for ſuch faults as appertain to the juriſdiction or cenſure of the eccleſiaſtical court. They are a kind of corporation, enabled by law to ſue for any thing belonging to their church, or poor of their pariſh. *Cowel.*—There ſhould likewiſe *church-wardens*, of the graveſt men in the pariſh, be appointed, as they be here in England. *Spenſer.*—

Our *church-wardens*
Feaſt on the ſilver, and give us the farthings.
Gay.

(2.) Church wardens, (*eccleſiæ guardiani*) in the Engliſh eccleſiaſtical polity, are the guardians of the church, and repreſentatives of the pariſh. They are ſometimes appointed by the miniſter, ſometimes by the pariſh, ſometimes by both. They are taken, in favour of the church, to be, for ſome purpoſes, a kind of corporation at the common law; that is, they are enabled, by that name, to have a property in goods and chattels, and to bring actions for them, for the uſe and profit of the pariſh. Yet they may not waſte the church goods, but may be removed by the pariſh, and then called to account by actions at common law: but there is no method of calling them to account but by firſt removing them; for none can legally do it but thoſe who are put in their place. As to lands or other real property, as the church, churchyard, &c. they have no ſort of intereſt therein; but if any damage is done thereto, the perſon only or vicar ſhall have the action. Their office is alſo to repair the church, and make rates and levies for that purpoſe; but theſe are recoverable only in the eccleſiaſtical courts. They are to levy a ſhilling forfeiture on all ſuch as do not go to church on ſundays and holidays; and are empowered to keep all perſons orderly while there; to which end it has been held that a church warden may juſtify the pulling off a man's hat, without being guilty of either an aſſault or treſpaſs. There are alſo a multitude of other petty parochial powers committed to their charge by divers acts of parliament.

Church-wharton, a village in the county of Norfolk, near Lynn-Regis.

(1.) * **CHURCHYARD.** *n. ſ.* The ground adjoining to the church in which the dead are buried; a cemetery.—In *churchyards*, where they bury much, the earth will conſume the corps in far ſhorter time than other earth will. *Bacon.*—

No place ſo ſacred from ſuch fops is barr'd;
Nor is Paul's church more ſafe than Paul's *churchyard*. *Pope.*

(2.) **Churchyard**, Thomas, a poet who flouriſhed in the reigns of Henry VIII. Edward VI. queen Mary and queen Elizabeth, was born at Shrewſbury; and inherited a fortune which he ſoon exhauſted in a fruitleſs attendance on the court, by which he only gained the favour of being retained a domeſtic in the family of lord Surry; when, by his lordſhip's encouragement, he commenced poet. Upon his patron's death, he applied to arms, was in many engagements, was frequently wounded, and was twice made priſoner. He publiſhed, 12 pieces, which he afterwards printed together in one volume, under the title of *Churchyard's Chips*; and alſo the tragedy of *Thomas Mourbray duke of Norfolk.* He died in 1570.

(3.) **Churchyards** (§ 1.) in the church of Rome, are conſecrated with great ſolemnity. If a churchyard, which has been thus conſecrated, ſhall afterwards be polluted, by any indecent action, or profaned by the burial of an infidel, an heretic, an excommunicated or unbaptized perſon, it muſt be *reconciled*; and the ceremony of the reconciliation is performed with the ſame ſolemnity as that of the conſecration.

* **CHURL.** *n. ſ.* [*ceorl*, Sax, *carl*, German, is ſtrong, ruſticks being always obſerved to be ſtrong bodied.] 1. A ruſtick; a countryman; a labourer.—He holdeth himſelf a gentleman, and ſcorneth to work or uſe any hard labour, which he ſaith is the life of a peaſant or *churl*. *Spenſer.* One of the baſer ſort, which they call *churls*, being reproved for his oath, anſwered confidently, that his lord commanded him. *Spenſer.* 2. A rude, ſurly, ill-bred man.—A *churl's* courteſy rarely comes, but either for gain or falſhood. *Sidney.* 3. A miſer; a niggard; a ſelfiſh or greedy wretch.—

Poiſon, I ſee, hath been his timeleſs end!
O *churl*, drink all, and leave no friendly drop
To help me after? *Shakeſpeare.*

CHURLE, **Ceorle**, or **Carl**, in the Saxon times, ſignified a tenant at will, who held of the thanes on condition of rent and ſervice. They were of two ſorts: one rented the eſtate like our farmers: the other tilled and manured the demeſnes, and were called ploughmen. See **Ceorles.**

* **CHURLISH.** *adj.* [from *churl.*] 1. Rude; brutal; harſh; auſtere; ſour; mercileſs; unkind; uncivil.—

A ſea of melting pearl, which ſome call tears,
Thoſe at her father's *churliſh* feet ſhe tender'd. *Shakeſpeare.*

—A lion in love with a laſs, deſired her father's conſent. The anſwer was *churliſh* enough, He'd never marry his daughter to a brute. *L'Eſtrange.*—

He the purſuit of *churliſh* beaſts,
Preferr'd to ſleeping on her breaſts. *Waller.*

2. Selfiſh: avaritious.—The man was *churliſh* and evil in his doings. 1 *Sam.*—

This ſullen *churliſh* thief
Had all his mind plac'd upon Mully's beef. *King.*

3. [Of things.] Unpliant; croſs-grained; unmanageable; harſh: not yielding.—If there be emiſſion of ſpirit, the body of the metal will be hard and *churliſh*. *Bacon.*—In the hundreds of Eſſex they have a very *churliſh* blue clay. *Mortimer.* 4. Vexatious; obſtructive.—Spain found the war ſo *churliſh* and longſome, as they found they ſhould conſume themſelves in an endleſs war. *Bacon.*—

Spreads a path clear as the day,
Where no *churliſh* rub ſays nay. *Craſhaw.*

* **CHURLISHLY.** *adv.* [from *churliſh.*] Rudely; brutally.—To the oak, now regnant, the olive did *churliſhly* put over the ſon for a reward of the ſervice of his ſire. *Howel.*

* **CHURLISHNESS.** *n. ſ.* [from *churliſh*: *cyrliſcneſſe*, Saxon,] Brutality: ruggedneſs of manner.—Better is the *churliſhneſs* of a man than a courteous woman. *Ecclus.* xlii. 14.—In the *churliſhneſs* of fortune, a poor honeſt man ſuffers in this world. *L'Eſtrange.*

* **CHURME.** *n. ſ.* [more properly *chirm*, from the Saxon *cyrme*, a clamour or noiſe; as to *chirre* is to coo as a turtle.] A confuſed ſound; a noiſe.—He was conveyed to the Tower with the *churme* of a thouſand taunts and reproaches. *Bacon*

(1.) **CHURN**, a river of England, which runs into the Thames at Cricklade.

(2.) * *A* **Churn.** *n. ſ.* [properly *chern*, from *kern*, Dut, *cerene*, Sax.] The veſſel in which butter is, by long and violent agitation, coagulated and ſeparated from the ſerous parts of the milk.—

Her aukward fiſt did ne'er employ the *churn*.
Gay's Paſtorals.

(3.) *A* Churn is a deep wooden veſſel, of a conical ſhape; reſting on its baſe, and having cloſely fitted into its upper part, a cover of wood, with a hole in its centre to admit the handle of the churn-ſtaff. This ſtaff conſiſts of a long upright pole, to the bottom of which is fixed a broad kind of foot, perforated at different parts, and calculated to occaſion a more univerſal agitation of the milk in churning. Many attempts have been made to improve this uſeful implement; but none have been accepted in our dairies, except the barrel churn, See § 4.

(4.) Churn, barrel, a kind of rolling barrel, with ſuch an apparatus within as is calculated to quicken the proceſs of making butter.

(5.) Churn, improved. Mr Bowler, in the Tranſactions of the Society for the Encouragement of Arts, &c. for 1795, gives the following deſcription of an improved churn. "The churn itſelf is of the barrel kind, being a cylinder, 18 inches in diameter, and 9 inches wide, the ſides of wood, and the rim tin plate, having two openings; the one 8½ inches long, by 4 inches wide, through which the cream is put into the churn, and the hand introduced for cleanſing it: the other, a ſhort pipe, one inch diameter, by which the butter milk runs out of the churn when the operation is finiſhed. The firſt of theſe openings has a wooden cover, faſtened down by two ſcrews and the other a cork fitted to it while the butter is churning. There is alſo, near the larger opening, a ſmall vent hole with a peg, to allow a paſſage, for any air diſcharged from the cream at the beginning of the operation. An axle paſſes through the churn, terminating in two gudgeons on which it hangs: its lower part being immerſed in a trough to hold occaſionally hot or cold water according to the ſeaſon of the year; and on the inſide of the rim are 4 projecting pieces of wood, with holes in them, ſerving to beat the cream by the motion of the churn: this motion is cauſed by a pendulum 3 feet 6 inches long, having an iron bob, weighing 10 lb. and at its upper end turning a pulley, 10 inches diameter, from which goes a rope twice round another pulley, about 3 inches diameter, fixed on the axis of the churn, and cauſing it to make a partial revolution by each vibration of the pendulum. There are ſliding covers to the machinery, and alſo a cover to the water trough, in order, when the hot water is uſed, to ſecure the ſteam, and keep the cream in a due and neceſſary degree of warmth. The motion of the pendulum is given and kept up by a wooden rod, about 3 feet 9 inches long, turning on a pin about 3 inches above the bob of the pendulum." See *Plate* LXXV. *fig.* 1. A, A. Is the body; B, an opening by which the cream is put in. C, The cover of the large opening: the ſmall hole on the oppoſite ſide of the churn cannot be ſhewn in this view. D, The gudgeon on which the body of the churn hangs. E, The upper or larger pulley. F, The ſmaller pulley fixed on the axis or gudgeon of the churn. G, G, The rod of the pendulum hanging from the upper pulley, E.—H, The bob of the pendulum. I, I, The handle, moveable on a pin at *a*, by which the pendulum is moved to and fro, making a traverſe in form of the dotted line K, K.—L, the trough for the hot or cold water. M, A projecting piece of wood. with a ſhoulder, by which the handle I I, is ſupported when the churn is not at work.

* *To* Churn. *v. a.* [*kernen*, Dutch.] 1. To agitate or ſhake any thing by a violent motion.—

Perchance he ſpoke not; but
Like a full acorn'd boar, a *churning* on,
Cried Oh. *Shakeſpeare.*

—The mechaniſm of nature, in converting our aliment, conſiſts in mixing with it animal juices, and, in the action of the ſolid parts, *churning* them together. *Arbuthnot.* 2. To make butter by agitating the milk.—The *churning* of milk brings the forth butter. *Proverbs.*—You may try the force of imagination, upon ſtaying the coming of butter after the *churning Bacon.*

CHURNET a river in Staffordſhire.

CHURNING, the operation of making butter by agitating milk in a churn. For accelerating this operation, a correſpondent in the Bath Society Papers recommends a little diſtilled vinegar to be poured into the churn; and the butter will be produced in an hour afterwards. He would not, however, recommend it to be uſed till the cream has undergone ſome conſiderable agitation. His firſt trial was after the churning had been going forward half a day: whether he obſerved the ſame rule afterwards he does not ſay, but all his trials proved ſucceſsful, the butter being uniformly obtained in about an hour after the mixture.

* CHURRWORM. *n. ſ.* [from *cyrran*, Saxon.] An inſect that turns about nimbly; called alſo a fancricket. *Skinner. Philips.*

CHURTON, the name of two villages in Cheſhire, lying N. and S. of Lea-Hall.

CHUS, or *Chuſch*, of the Scriptures, has long been interpreted *Ethiopia*, and Chuschi an *Ethiopian*. The Septuagint and Vulgate conſtantly tranſlate it ſo; and in this they are followed by moſt interpreters, as well as by Joſephus and Jerome. Yet what Bochart urges to the contrary, from Ezekiel xxix. 10. in which the two oppoſite extremes of Egypt are deſigned, is of ſome weight: and therefore *Chus*, which is oppoſite to Syene, muſt be Arabia. This is more ſtrongly pointed out by Xenophon, by whom Ethiopia is ſaid to be the S. boundary of Cyrus's empire; and Herodotus diſtinguiſhes between the Ethiopians of Aſia and Africa, conjoining the former with the Arabians.

CHUSAN, or Chuxan, an iſland on the E. coaſt of China, near the province of Chekiam; where the Engliſh Eaſt India Company had once a factory. Lon 124. 0. E. Lat. 30. 0. N.

* *To* CHUSE. See *To* Choose.

CHUSHAN-RISHATHAIM, a king of Meſopotamia, who oppreſſed the Iſraelites 8 years, from A. M. 2591, till they were delivered by Othniel, A. M. 2599. Judg. iii. 8—10.

CHUSISTAN, a province in the SW. of Perſia, bounded by the Perſian Gulf on the S and by Irac Agemi on the N.

(1.) CHUTE, a river in Wiltſhire.

(2.) Chute, a village in Wilts, NE. of Luggerſhall.

CHUTENHAM, near Mendip hills, Somerſet.

Plate LXXV.

Fig. 1. Bowler's Improved Churn.

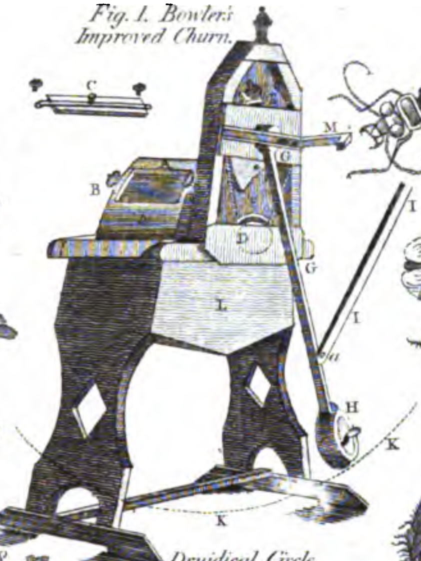


Fig. 2. Cicadæ

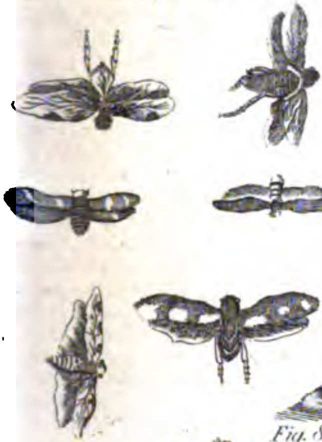


Fig. 3. Cicindela.

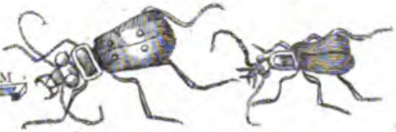


Fig. 4. Cimex.

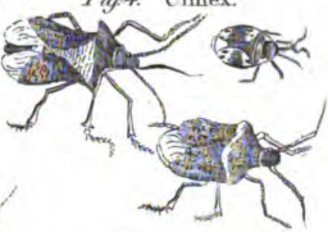


Fig. 5. Cimex paradoxus.

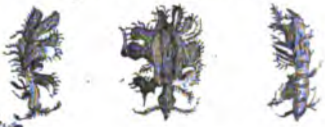


Fig. 8. Druidical Circle.

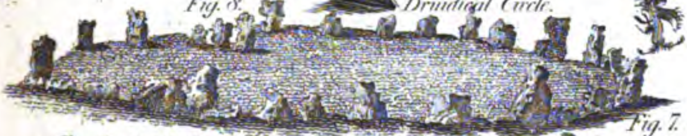


Fig. 6. Jesuits Bark Cinchona Corymbifera.

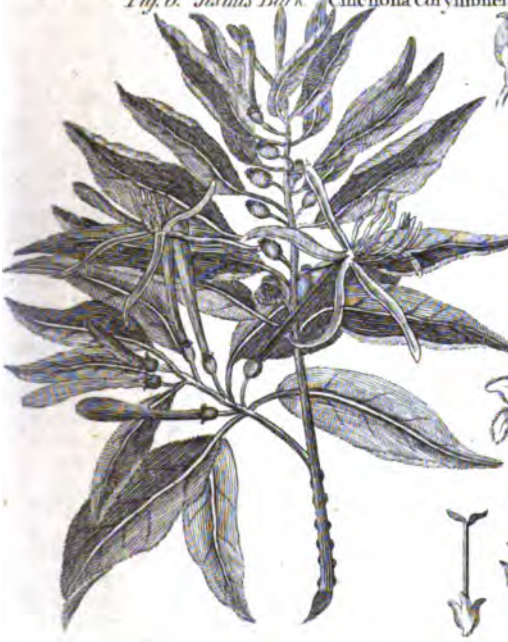
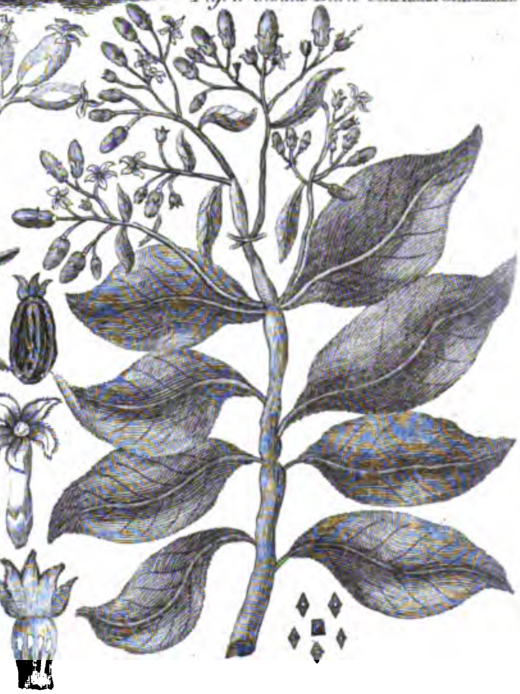


Fig. 7. Jesuits Bark Cinchona Officinalis.



CHUXAN, or CHEUXAN. See CHUSAN.

CHUZ, or CHUR, a river of Switzerland, in the canton of Apenzel.

* CHYLACEOUS. *adj.* [from *chyle.*] Belonging to chyle; conſiſting of chyle.—When the ſpirits of the chyle have half fermented the *chyluceous* maſs, it has the ſtate of drink, not ripened by fermentation. *Floyer.*

(1.) * CHYLE. *n. ſ.* [χυλὸς.] The white juice formed in the ſtomach by digeſtion of the aliment, and afterwards changed into blood.—

This powerful ferment, mingling with the parts,
The leven'd maſs to milky *chyle* converts. *Blackm.*

—The *chyle* cannot paſs through the ſmalleſt veſſels. *Arbuthnot.*

(2.) CHYLE. See ANATOMY, *Index.* The chyle has by ſome authors been thought to have a great reſemblance in its nature and chemical analyſis to milk. The ſubject, however, hath as yet been but little inquired into. See MILK.

CHYLEMATIS, in ancient geography, a large river of Africa, in Algiers, mentioned by Ptolemy ſuppoſed to be the ſame with the MINA, or CENA.

* CHYLIFACTION. *n. ſ.* [from *chyle.*] The act or proceſs of making chyle in the body.—Drinking exceſſively during the time of *chylifaction*, ſtops perſpiration. *Arbuthnot.*

* CHYLIFACTIVE. *adj.* [from *chylus* and *facio*, to make, Lat.] Having the power of making chyle.

CHYLIFICATION. See CHYLIFACTION.

* CHYLOPOETICK. *adj.* [χυλὸς, and ποιέω.] Having the power, or the office, of forming chyle. —According to the force of the *chylopoetick* organs, more or leſs chyle may be extracted from the ſame food. *Arbuthnot.*

CHYLOSIS, in medicine, the action whereby the aliment is converted into chyle in the ſtomach, &c.

* CHYLOUS. *adj.* [from *chyle.*] Conſiſting of chyle; partaking of chyle.—Milk is the *chylous* part of an animal, already prepared. *Arbuthnot.*

CHYME, or CHYMUS, denotes every kind of humour which is incraſſated by concoction; and comprehends all the humours fit or unfit for preſerving and nouriſhing the body, whether good or bad. It frequently imports the fineſt part of the chyle, when ſeparated from the fæces, and contained in the lacteal and thoracic duct.

* CHYMIC. *n. ſ.* A chymiſt. Obſolete.—The ancients obſerving in that material a kind of metallical nature, ſeem to have reſolved it into nobler uſe: an art now utterly loſt, or perchance kept up by a few *chymics*. *Wotton.*

* CHYMICAL. CHYMICK. *adj.* [*chymicus*, Lat.] 1. Made by chymiſtry.—

I'm tir'd with waiting for this *chymick* gold,
Which fools us young, and beggars us when old.
Dryden.

—The medicines are ranged in boxes, according to their natures, whether *chymical* or Galenical preparations. *Watts.* 2. Relating to chymiſtry.

With *chymick* art exalts the min'ral pow'rs,
And draws the aromatick ſouls of flow'rs. *Pope.*

* CHYMICALLY. *adv.* [from *chymical.*] In a chymical manner.

* CHYMIST. *n. ſ.* [See CHYMISTRY.] A profeſſor of chymiſtry; a philoſopher by fire.—

The ſtarving *chymiſt*, in his golden views
Supremely bleſt. *Pope's Eſſay on Man.*

(1.) * CHYMISTRY. *n. ſ.* [derived by ſome from χυμὸς, juice, or χυω, to melt; by others from an oriental word, *kema*, black. According to the ſuppoſed etymology, it is written with *y* or *e.*] —An art whereby ſenſible bodies contained in veſſels, or capable of being contained therein, are ſo changed, by means of certain inſtruments, and principally fire, that their ſeveral powers and virtues are thereby diſcovered, with a view to philoſophy, or medicine. *Boerhaave.*

(2.) CHYMISTRY. See CHEMISTRY.

CHYMOLOGI, an appellation given to naturaliſts who have employed their time in inveſtigating the properties of plants from their taſte and ſmell.

(1.) CHYMOSIS, [from χυμος, juice, and χυω to melt,] in medicine, the act of making or preparing chyme. Chymoſis, according to ſome, is the 2d concoction made in the body; being a repeated preparation of the moſt impure and groſs parts of the chyle, which being rejected by the lacteals, is imbibed by the meſeraics, and thence carried to the liver, to be there elaborated, purified, and ſubtilized afreſh. It is of this, according to Rogers, that the animal ſpirits are formed.

(2.) CHYMOSIS ſignifies alſo a diſtortion of the eye lids; likewiſe an inflammation of the tunica cornea. See CHEMOSIS.

CHYTLA, in antiquity, a liquor made of wine and oil, and ſometimes uſed in divination.

CHYTRI, in antiquity, a feſtival in honour of Bacchus and Mercury, kept by the Athenians on the 13th of the month Antheſterion.

CHYTRIUM, in ancient geography, a place in Ionia, in which formerly ſtood Clazomene; the Clazomenians, through fear of the Perſians, removing from the continent to an adjacent iſland. Alexander reduced the iſland, by a mole or cauſeway, to a peninſula.

CHYTRUS, in ancient geography, a town of Cyprus, N. of Citium; famous for its fine honey

CIA. See CEOS.

(1.) CIALUS, a kingdom of Aſia, in independent Tartary, bounded on the N. by the kingdom of Eluth; on the E. by large ſandy deſerts; on the S. by Thibet, and on the W. by Turkiſtan.

(2.) CIALUS, the capital of CIALUS, N° 1.

CIAMPA, a kingdom of Aſia in the E. Indies, bounded on the E. and S. by the Indian Ocean; on the N. by the deſerts of Cochin-China; and on the W. by Cambodia.

CIANUS SINUS, in ancient geography, a bay of Bithynia, ſo named from the river CIUS.

CIBALÆ, or CIBALIS, in ancient geography, a town of Pannonia Inferior, ſeated on an eminence, near the lake Hiulka, NW. of Sirmium. The emperor Gratian was born in it, and was brought up to ropemaking: and it was rendered famous by the ſurpriſal and defeat of Licinius by Conſtantine.

CIBAO, a mountain near the centre of the iſland of St Domingo, which abounds in mines of gold, ſilver, and copper.

* CIBARIOUS. *adj.* [*cibarius*, Lat. [from *cibus*, food.] Relating to food; uſeful for food; edible.

(1.) CIBBER, Caius Gabriel, a native of Holſtein, and a ſkilful ſtatuary, who executed the baſſo relievo on the pedeſtal of the monument, and the two admired figures of lunatics over the piers of the gate to Bethlem Hoſpital in Moorfields.

(2.) CIBBER, Colley, the ſon of Caius Gabriel, (N° 1.) a celebrated comedian, dramatic writer and poet laureat to the king, was born at London in 1671. He derived his Chriſtian name from the ſurname of his mother's family, and was intended for the church, but betook himſelf to the ſtage, for which he conceived an early inclination; though it was ſome time before he acquired any degree of notice, or even a competent ſalary. His firſt eſſay in writing, was the comedy of *Love's laſt Shift*, acted in 1695, which met with ſucceſs: as did his own performance of the character of the fop in it. From that time, as he ſays himſelf, "My muſe and my ſpouſe were ſo equally prolific, that the one was ſeldom the mother of a child but in the ſame year the other made me the father of a play. I think we had a dozen of each ſort between us; of both which kinds ſome died in their infancy, and near an equal number of each were alive when we quitted the theatre." The *Careleſs Huſband*, acted in 1704, met with great applauſe, and is reckoned his beſt play; but none was of more importance to him than the *Non-juror*, acted in 1717, and levelled againſt the Jacobites. This laid the foundation of the miſunderſtanding between him and Mr Pope, raiſed him to be the hero of the Dunciad, and made him poet laureat in 1730. He then quitted the ſtage, except a few occaſional performances: and died in 1757. Cibber neither ſucceeded in acting nor in writing tragedy; and his odes were not thought to partake of the genius or ſpirit he ſhowed in his comedies.

(3.) CIBER, Theophilus, the ſon of Colley, was alſo a comic actor. He was born during a great ſtorm in 1703; and after paſſing a life of extravagance, diſtreſs, and perplexity, periſhed in another ſtorm in 1758, in the paſſage between Dublin and England. He married the ſiſter of Thomas Auguſtin Arne, the famous muſical compoſer; who became a famous tragic actreſs, but whoſe honour was ſacrificed to her huſband's extravagance.

CIBDELOPLACIA, in natural hiſtory; a genus of ſpars debaſed by a very large admixture of earth. They are opaque, formed of thin cruſts, covering vegetables and other bodies, by way of incruſtations. Of this genus we have the following ſpecies: 1. A greyiſh white, cibdeloplacium, with a rough ſurface: 2. A whitiſh brown one: both theſe are friable. 3. The hard, pale brown kind, which is the OSTEOCOLLA of the ſhops. 4. The whitiſh grey kind, with a ſmooth ſurface: this is the UNICORNU foſſile and *ceratites* of authors. 5. The whitiſh brown corraloide kind.

CIBDELOSTRACIA, in natural hiſtory, terrene ſpars, deſtitute of all brightneſs and tranſparence, formed into thin plates, and uſually found coating over the ſides of fiſſures, and other cavities of ſtones, with congeries of them of great extent, and of plain or botroyide ſurfaces. Of theſe there are uſually reckoned 7 kinds: viz. 1. The hard, browniſh white cibdeloſtracium, found in Germany: 2. The hard, whitiſh cibdeloſtracium, with thin cruſts, and a ſmoother ſurface, found alſo in the Harts-foreſts in Germany: 3. The hard, pale brown cibdeloſtracium, with numerous very thin cruſts, found in ſubterranean caverns in England and Germany: 4. The white, light and friable cibdeloſtracium, found alſo in Germany, but very rarely in any part of England: 5. The light hard, pale brown cibdeloſtracium, with a ſmooth ſurface, found in almoſt all parts of the world: 6. The whitiſh, friable, cruſtaceous cibdeloſtracium, with a rougher ſurface, frequent in Germany and England; and, 7. The browniſh white friable cibdeloſtracium, with a duſty ſurface, found in ſeveral parts of Ireland, as well as Germany.

(1.) * CIBOL. *n. ſ.* [*ciboule*, Fr.] A ſmall ſort of onion uſed in ſallads. This word is common in the Scotch dialect; but the *l* is not pronounced. —*Ciboules*, or ſcallions, are a kind of degenerate onions. *Mortimer*.

(2.) CIBOL, or CIBOULE. See ALLIUM.

CIBOLA, a province of N. America, in New Mexico, inhabited by the original American Indians, who have ſeveral villages in it.

CIBORIA, [*Ciborium*, Egypt: *i. e.* a cup,] in antiquity, the large huſk of Egyptian beans, which are ſaid to have been ſo large as to ſerve for drinking cups; whence the name.

CIBORIUM, in eccleſiaſtical writers, the covering for the altar. This covering is ſupported by 4 high columns, and forms a kind of tent for the euchariſt, in the Romiſh churches. Some authors call it *turris geſtoria* and others *pyxis*; but the pyxis is properly the box in which the euchariſt is preſerved.

CIBOTOS. See APAMEA, N° 2.

CIBULON, a town of Aſia, in the country of Thibet, 8 miles NE of Zuenga.

CIBUS FERIALIS, in antiquity, an entertainment peculiar to a funeral; for which purpoſe beans, parſley, lettuce, bread, eggs, lentils, and ſalts were in uſe.

CICACIO, a diſtrict of South America, and a chief place of a juriſdiction of the ſame name, in the government of Buenos Ayres, 80 leagues in extent.

(1.) CICACOLE, one of the northern circars of Hindooſtan, on the NW. coaſt of the bay of Bengal, 150 miles in length, and from 15 to 30 in breadth.

(2.) CICACOLE, the capital of the above circar, lies 150 miles NE. of Rajamundy, and 308 E. of Hydrabad. Lon. 84. 8. E. Greenwich. Lat. 18. 16. N.

CICADA, the FROG-HOPPER or FLEA-LOCUST, in zoology, a genus of inſects belonging to the order of hemiptera. See *Plate* LXXV. *Fig.* 2. The beak is inflected; the antennæ are ſetaceous; the four wings are membranaceous and deflected; and the feet, in moſt of the ſpecies, are of the jumping kind. The ſpecies are 51. The larvæ of ſeveral of this genus evacuate great quantities of a frothy matter upon the branches and leaves of plants, in the midſt of which they conſtantly reſide, probably for ſhelter againſt the ſearch of other animals, to which they would become a prey. Nature has afforded this kind of defence to inſects whoſe naked and ſoft bodies might otherwiſe very eaſily be injured; perhaps alſo the moiſture of this foam may ſerve to ſcreen them from the ſultry beams of the ſun. On removing the foam the larva appears, but it ſoon emits freſh foam, that hides it again from the eye. In the midſt of this foamy ſubſtance the larva goes through its metamorphoſis into a chryſalis and perfect inſect. Other larvæ, whoſe bodies are not ſo ſoft, run over plants without any manner of defence, and eſcape from inſects that might hurt them, by nimble running, or leaping. The chryſalids, and all the larvæ that produce them, differ little from each other, only that the former have the rudiments of wings, a kind of knob at the place where the wings will afterwards be in the perfect inſect. The chryſalids walk, leap, and run over plants and trees; as do the larva and the frog-hoppers, which they produce. At length they throw off their teguments of chryſalids, ſlip their laſt ſlough, and then the inſect appears in its utmoſt perfection. The male alone is then endowed with the faculty of ſinging, which it exerciſes not with its throat, but with an organ ſituated under the abdomen. Behind the legs of the male are obſerved two valvulæ, which, raiſed up, diſcover ſeveral cavities, ſeparated by various membranes. The middle contains a ſcaly triangle. Two vigorous muſcles give motion to another membrane, which alternately becomes concave and convex. The air agitated by this membrane, is modified within the other cavities; and by the help of this ſonorous inſtrument, he amorouſly ſolicits his female. By pulling the muſcles of a frog-hopper lately dead, it may be made to ſing. This inſect begins its ſong early in the morning, and continues it during the heat of the noon-tide ſun. Its lively and animated muſic is, to the country people, a preſage of a fine ſummer, a plentiful harveſt, and the ſure return of ſpring. The cicadæ have a head almoſt triangular, an oblong body, their wings faſtigiated or in form of a roof, and ſix legs with which they walk and leap pretty briſkly. In the females, at the extremity of the abdomen are two large laminæ, between which is incloſed, as in a ſheath, a ſpine ſomewhat ſerrated, which ſerves them to depoſit their eggs, and probably to ſink them into the ſubſtance of thoſe plants, which the young larvæ are to feed upon.

* CICATRICE. Cicatrix. *n.ſ.* [*cicatrix*, Lat. 1. The ſcar remaining after a wound.—One captain Spurio with his *cicatrice*, an emblem of war, here on his ſiniſter cheek. *Shakeſp.* 2. A mark; an impreſſion: ſo uſed by *Shakeſpeare* leſs properly.

Lean but upon a ruſh
The *cicatrice* and capable impreſſure
Thy palm ſome moment keeps. *Shakeſpeare.*

CICATRICULA, in natural hiſtory, a ſmall whitiſh ſpeck in the yolk of an egg, which is the firſt rudiments of the future chick. Whatever way the egg is turned, that part of the yolk, which contains the cicatricula, is always uppermoſt, as is ſeen upon breaking an egg.

(1.) * CICATRISANT. *n.ſ.* [from *cicatrice.*] An application that induces a cicatrice.

(2.) Cicatrisants, in pharmacy, conſiſt of Armenian bole, powder of tutty, &c. They are alſo called Escharotics, *epulotics*, *incarnatives*, *agglutinants*, &c.

* CICATRISIVE. *adj.* [from *cicatrice.*] Having the qualities proper to induce a cicatrice.

CICATRIX, in ſurgery, a little ſeam or elevation of callous fleſh on the ſkin, after the healing of a wound or ulcer. See Cicatrice.

* CICATRIZATION. *n.ſ.* [from *cicatrice.*] 1. The act of healing the wound—A vein burſted or corroded in the lungs, is looked upon to be for the moſt part incurable, becauſe of the motion and coughing of the lungs, tearing the gap wider, and hindering the conglutination and *cicatrization* of the vein. *Harvey.* 2. The ſtate of being healed, or ſkinned over.—The firſt ſtage of healing, or the diſcharge of matter, is called digeſtion; the ſecond, or the filling up with fleſh, incarnation; and the laſt or ſkinning over *cicatrization. Sharp's Surgery.*

* *To* Cicatrize. *v.a.* [from *cicatrix.*] 1. To apply ſuch medicines to wounds, or ulcers, as heal and ſkin them over. *Quincy.* 2. To heal and induce the ſkin over a ſore.—We incarned, and in a few days *cicatrized* it with a ſmooth cicatrix. *Wiſeman on Tumours.*

CICCA, in botany; a genus of the tetrandria order, belonging to the monœcia claſs of plants. The male calyx is tetraphyllous; there is no corolla: the female calyx triphyllous; no corolla; four ſtyles; the capſule quadricoccous; or four-berried.

(1.) * CICELY. *n.ſ.* [*myrrhis.*] A ſort of herb.

(2.) Cicely. See Chærophyllum.

CICER, the Chick Pea, in botany: A genus of the decandria order, belonging to the diadelphia claſs of plants; and in the natural method ranking under the 32d order, *Papilionaceæ*. The calyx is quinquepartite, as long as the corolla; with its 4 uppermoſt ſegments incumbent on the vexillum: the legumen is rhomboidal, turgid, and diſpermous. There is but one ſpecies, which produces peaſe ſhaped like the common ones, but much ſmaller. They are much cultivated in Spain, where they are natives, being one of the ingredients in their olios; as alſo in France; but are rarely known in Britain.

CICERO, Marcus Tullius, the celebrated Roman orator, was born A. U. C. 647, and A. A. C. 107. His father Marcus Tullius, who was of the equeſtrian order, took great care of his education, which was directed to the bar. Young Tully, at his firſt appearance in public, declaimed with ſuch vehemence againſt Sylla's party, that it became neceſſary for him to retire into Greece; where he heard the Athenian orators and philoſophers, and greatly improved both in eloquence and knowledge. Here he met with T. Pomponius, who had been his ſchool-fellow; and who, from his love to Athens, obtained the ſurname of Atticus; and here they revived and confirmed that friendſhip which ſubſiſted between them through life. From Athens he paſſed into Aſia; and after an excurſion of two years returned to Rome; where next year he was made quæſtor. The quæſtors were ſent annually into the provinces diſtributed to them by lot. Lilybæum in Sicily happened to fall to Cicero's ſhare. In this office he acquitted himſelf ſo well, that he gained the love and admiration of all the Sicilians. Before he left Sicily, he made the tour of the iſland, to ſee every thing that was curious, and eſpecially the city of Syracuſe; where he diſcovered the tomb of Archimedes to the magiſtrates who were ſhowing him the curioſities of the place, but who, to his ſurpriſe, knew nothing of it. His marriage with Terentia, is ſuppoſed to have been celebrated immediately after his return, when he was about 30 years old. By his queſtorſhip, he gained an admiſſion into the Senate for life; and he employed himſelf conſtantly in defending the perſons and properties of his fellow citizens. In his 37th year, he was elected Ædile, by the unanimous ſuffrages of all the tribes, and in preference to all his competitors. After his election but before his entrance upon the office, he undertook the famed proſecution of C. Verres, the late prætor of Sicily; who was charged with many flagrant acts of injuſtice, rapine, and cruelty, during his triennial government of that iſland. This was one of the moſt memorable tranſactions of his life; for which he was juſtly celebrated by antiquity, and for which he will, in all ages, be eſteemed by the friends of mankind. The reſult was, that he ſo confounded Hortenſius, then the reigning orator at the bar, and uſually ſtyled *the king of the forum*, that he had nothing to ſay for his client. Verres, deſpairing of all defence, went into a voluntary exile; where he lived many years, deſerted by his friends. He is ſaid to have been relieved in this miſerable ſituation by the generoſity of Cicero; yet after all was proſcribed and murdered by Mark Antony, for the ſake of thoſe fine ſtatues and Corinthian veſſels, of which he had plundered the Sicilians. After the uſual interval, Cicero offered himſelf a candidate for the prætorſhip; and, in three different aſſemblies convened for the choice, he was unanimouſly elected the firſt prætor. He was now in the career of his fortunes; and in ſight, as it were, of the conſulſhip, and therefore, when his prætorſhip was at an end, he would not accept of any foreign province, the chief fruit which the generality propoſed from that office. He had no particular love for money, nor genius for arms. The glory he purſued, was to ſhine in the city, as the guardian of its laws; and to teach the magiſtrates how to execute, the citizens how to obey them. Being now in his 43d year, he declared himſelf a candidate for the conſulſhip along with ſix competitors, of whom, were four patricians, or nobles, and the two laſt the ſons of fathers who had firſt imported the public honours into their families. Cicero was the only *new man*, among them. In this competition the practice of bribing was carried on as ſhamefully by Antonius and Catiline, as it uſually is at our elections in Britain. However, as the election approached, Cicero's intereſt appeared ſuperior to that of all his candidates: for the nobles themſelves, though deſirous to depreſs him, yet from the dangers which threatened the city, and ſeemed ready to burſt out, began to think him the only man qualified to preſerve the republic, and break the cabals of the deſperate, by the vigour and prudence of his adminiſtration. The method of chooſing conſuls was not by an open vote; but by a kind of ballot, or little tickets of wood diſtributed to the citizens, with the names of the ſeveral candidates inſcribed upon each; but in Cicero's caſe the people were not content with this ſecret and ſilent way; but, before they came to any ſcrutiny, loudly and univerſally proclaimed Cicero the firſt conſul; ſo that, as he himſelf ſays, "he was not choſen by the votes of particular citizens, but by the common ſuffrage of the city; nor declared by the voice of the crier, but of the whole Roman people." Cicero had no ſooner entered upon his office than he had occaſion to exert himſelf againſt P. Servilius Rullus, one of the new tribunes, who had been alarming the ſenate with the promulgation of an Agrarian law; the purpoſe of which was to create a decemvirate, or ten commiſſioners, with abſolute power for five years over all the revenues of the republic, to diſtribute them at pleaſure to the citizens, &c. Theſe laws uſed to be greedily received by the populace, but Cicero in an artful and elegant ſpeech from the roſtra, gave ſuch a turn to the inclination of the people, that they rejected this law with as much eagerneſs, as they had ever received one. But the grand affair, which conſtituted the glory of his conſulſhip, and has tranſmitted his name with luſtre to poſterity, was the unwearied pains he took, in ſuppreſſing that horrid conſpiracy which was formed by Catiline, for the ſubverſion of the commonwealth. For this great ſervice he was honoured with the glorious title of *pater patriæ*, the father of his country. Cicero had no ſooner quitted his office, than he began to feel the weight of that envy, which is the certain fruit of illuſtrious merit. He was now, therefore, the common mark, not only of all the factious, againſt whom he had declared perpetual war, but of another party not leſs dangerous, the envious too; whoſe united ſpleen never left him, till they had driven him out of that city which he had preſerved. Cicero, upon the expiration of his conſulſhip, took care to ſend a particular account of his whole adminiſtration to Pompey, who was finiſhing the Mithridatic war in Aſia; in hopes to prevent any wrong impreſſions there from the calumnies of his enemies, and to draw from him ſome public declaration in praiſe of what he had been doing. But Pompey, being informed by Metellus and Cæſar, of the ill humour that was riſing againſt Cicero in Rome, anſwered him with great coldneſs; and inſtead of paying him any compliment, took no notice of the affair of Catiline: upon which Cicero expoſtulates with him in a letter which is ſtill extant. About this time Cicero bought a houſe of M. Craſſus on the Palatine hill, adjoining to that in which he had always lived with his father, and which he is now ſuppoſed to have given up to his brother Quintus. The houſe coſt him near L.30,000, and ſeems to have been one of the nobleſt in Rome. This excited cenſure on his vanity; and eſpecially as it was made with borrowed money. This circumſtance he himſelf does not diſſemble; but ſays merrily upon it, that "he was now plunged ſo deeply in debt, as to be ready for a plot, only that the conſpirators would not truſt him.' The moſt remarkable event that happened this year, (the 45th of Cicero's life,) was the pollution of the myſteries of the *Bona Dea* by P. Clodius; which, by its conſequences involved Cicero in no ſmall calamity. Clodius had an intrigue with Cæſar's wife Pompeia, who was celebrating in her houſe thoſe awful ſacrifices of the goddeſs, to which no male creature was ever admitted. Clodius wiſhed o gain acceſs to his miſtreſs in the midſt of her oly miniſtry; and with this view he dreſſed himſelf in a woman's habit, that by the benefit of his nooth face, and the introduction of one of the naids, he might paſs without diſcovery: but by ome miſtake between him and his guide, he loſt is way when he came within the houſe, and fell n among the other female ſervants. Here he was letected by his voice, and the ſervants alarmed he whole company by their ſhrieks, to the great mazement of the matrons, who threw a veil over their ſacred myſteries, while Clodius found neans to eſcape. The ſtory was preſently ſpread broad, and raiſed a general ſcandal and horror hroughout the city. The defence which Clodius made, when, by order of the ſenate, he was rought to a trial, was to prove himſelf abſent at he time of the fact; for which purpoſe he produced two men to ſwear that he was then at Interamna, about 2 or 3 days journey from the city. But Cicero being called upon to give his teſtimony, depoſed, that Clodius had been with him that very morning at his houſe in Rome. Irritated by this, Clodius formed a ſcheme of revenge. This was to get himſelf choſen tribune, and in that office to drive Cicero out of the city, by the publication of a law, which he hoped to obtrude upon the people. The firſt triumvirate was now formed; which was nothing but a traiterous conſpiracy of three of the moſt powerful citizens of Rome, to extort from their country by violence what they could not obtain by law. Pompey's chief motive was to get his acts confirmed by Cæſar in his conſulſhip, which was now coming on; Cæſar, by giving way to Pompey's glory, to advance his own; and Craſſus, to gain that aſcendence by the authority of Pompey and Cæſar, which he could not ſuſtain alone. Cicero might have made what terms he pleaſed with the triumvirate, but he would not enter into any engagements with men, whoſe union all the friends of the republic abhorred. Clodius, in the mean time, being choſen tribune, began to threaten Cicero with all the terrors of his tribunate. Both Cæſar and Pompey ſecretly favoured his ſcheme: not that they intended to ruin Cicero, but only to keep him under the laſh; and if they could not draw him into their meaſures, or make him at leaſt keep quiet, to let Clodius looſe upon him. Cæſar wanted to diſtreſs him ſo far as to force him to a dependence on himſelf: for which end, while he was privately encouraging Clodius to purſue him, he propoſed expedients to Cicero for his ſecurity. But Cicero was unwilling to owe the obligation of his ſafety to any man, far leſs to Cæſar, whoſe deſigns he always ſuſpected, and whoſe ſchemes he never approved. This ſtiffneſs ſo exaſperated Cæſar, that he reſolved to aſſiſt Clodius to oppreſs him; while Pompey was all the while giving him the ſtrongeſt aſſurances that there was no danger, and that he would ſooner be killed himſelf than ſuffer him to be hurt. Clodius, in the meantime, was obliging the people with ſeveral new laws, contrived chiefly for their advantage; that he might introduce, with better grace, the baniſhment of Cicero In ſhort, having cauſed a law to be enacted, that any who had condemned a Roman citizen unheard ſhould himſelf be baniſhed, he ſoon after impeached Cicero upon it. It was in vain that this great man went about ſoliciting his cauſe as a ſuppliant, and attended by many of the firſt young noblemen whom he had taught the rules of eloquence; thoſe powers of ſpeaking, which had ſo often been ſucceſsful in defending the cauſe of others, ſeemed totally to forſake his own: he was baniſhed by the votes of the people 400 miles from Italy; his houſes were ordered to be demoliſhed, and his goods ſet up to ſale. In this calamity he did not behave himſelf with that firmneſs, which might have been expected from one conſcious of his integrity, and ſuffering in the cauſe of his country: for his letters are filled with ſuch lamentable expreſſions of grief and deſpair, that his beſt friends and even his wife, were forced to admoniſh him to rouſe his courage, and remember his former character. To have been as great in affliction as he was in proſperity, would have been a perfection not given to man: yet this very weakneſs flowed from a ſource which rendered him the more amiable. The ſame tenderneſs of diſpoſition which made him love his friends, his children, and his country, more paſſionately than other men, made him feel the loſs of them more ſenſibly. When he had been gone a little more than two months, a motion was made in the ſenate by one of the tribunes, who was his friend, to recal him, and repeal the laws of Clodius; to which the whole houſe readily agreed, notwithſtanding the oppoſition made by the Clodian faction. Cicero's return was carried, in ſo triumphant a manner, that he had reaſon, he ſays, to fear, leaſt people ſhould imagine that he himſelf had contrived his late flight for the ſake of ſo glorious a reſtoration. He was in his 50th year, when he was reſtored to his dignity, and fortunes; ſatisfaction being made to him for the ruin of his eſtates and houſes. But he had domeſtic grievances about this time, which touched him very nearly; and which, as he ſignifies to Atticus, were of too delicate a nature to be expreſſed in a letter: they aroſe chiefly from the petulant humour of his wife, which began to give him frequent occaſions of chagrin; and, by a ſeries of repeated provocations, confirmed in him that ſettled diſguſt which at laſt ended in a divorce. In the 56th year of his age, he was made proconſul of Cilicia; where his adminiſtration gained him great honour. About this time the expectation of a breach between Cæſar and Pompey engaged the general attention. Cæſar had put an end to the Gallic war, and reduced the whole province to the Roman yoke: but though his commiſſion was near expiring, he had no thoughts of giving it up and returning to the condition of a private ſubject. He pretended that he could not poſſibly be ſafe, if he parted with his army; while Pompey held the province of Spain prolonged for five years. This diſpoſition to a breach, Cicero ſoon learned from his friends, as he was returning from his province of Cilicia. He clearly foreſaw, what he declared to his friends, that which ſide ſoever got the better, the war muſt neceſſarily end in a *tyranny*. The only difference, he ſaid, was, that if their enemies conquered, they ſhould be proſcribed; if their friends, they would be ſlaves. He no ſooner arrived at the city, than he found the war in effect proclaimed: for the ſenate had juſt voted a decree, that Cæſar ſhould diſband his army by a certain day, or be declared an enemy; and Cæſar's ſudden march towards Rome confirmed it. In the midſt of all this confuſion, Cæſar was extremely ſolicitous about Cicero; not ſo much to gain him, as to prevail with him to ſtand neuter. He wrote to him ſeveral times, and employed all their mutual friends to preſs him with letters on that ſubject: all which was done; but in vain, for Cicero was impatient to be gone to Pompey. Theſe letters give us a ſtrong proof of the high eſteem in which Cicero was held at this time in Rome; when, in a conteſt for empire, which force alone was to decide, the chiefs on both ſides were ſolicitous to gain a man to their party, who had no ſkill in gams or talents for war. Cicero at laſt embarked to follow Pompey, who had been obliged to quit Italy ſome time before, and was then at Dyrrhachium; and arrived ſafely in his camp with his ſon, his brother, and his nephew, committing the fortunes of the family to the iſſue of that cauſe. After the battle of Pharſalia, in which Pompey was defeated, Cicero returned into Italy, and was received into great favour by Cæſar, who was now declared dictator the ſecond time, and Mark Antony his maſter of horſe. It appears from his letters, that Cicero was not a little diſcompoſed at the thoughts of an interview with a conqueror, againſt whom he had been in arms; for though he might expect a kind reception, yet he hardly thought his life, he ſays, worth begging; ſince what was given by a maſter might always be taken away at pleaſure. But at their meeting, he had no occaſion to ſay or do any thing below his dignity: for Cæſar no ſooner ſaw him than he alighted, ran to embrace him; and walked with him alone, converſing very familiarly, for ſeveral furlongs. Cicero was now in his 61ſt year, and forced at laſt to part with his wife Terentia; whoſe humour and conduct had long been uneaſy to him. She was a woman of an imperious ſpirit: and though he had borne her perverſeneſs in the vigour of health, and flouriſhing ſtate of his fortunes; yet, in a declining life, ſoured by a ſucceſſion of mortifications from abroad, the want of eaſe and quiet at home was no longer tolerable. But he was immediately oppreſſed by a new and moſt cruel affliction, the death of his beloved daughter Tullia, who died in child-bed ſoon after her divorce from her 3d huſband Dolabella. She was about 32 years old at the time of her death; and, by the few hints which are left of her character, appears to have been an excellent and admirable woman. She was moſt affectionately attentive to her father; and, to the uſual graces of her ſex, having added knowledge and polite letters, was qualified to be the companion and delight of his age; and was juſtly eſteemed not only as one of the beſt, but the moſt learned of the Roman ladies. His affliction for her death was ſo great, that, to ſhun all company as much as he could, he removed to Atticus's houſe, where he lived chiefly in his library, turning over every book he could meet with on the ſubject of moderating grief. But finding his reſidence here too public, he retired to Aſturia, one of his ſeats near Antium; a little iſland on the Latin ſhore, covered with woods and groves cut into ſhady walks; a ſcene of all others the fitteſt to indulge melancholy, and where he could give a free courſe to his grief. "Here (ſays he to Atticus) I live without the ſpeech of man; every morning early I hide myſelf in the thickeſt of the wood, and never come out till the evening. Next to yourſelf, nothing is ſo dear to me as this ſolitude; and my whole converſation is with my books." In this retreat he drew up one of the graveſt of thoſe philoſophical pieces which are ſtill extant in his works. Upon the death of Cæſar, Octavius his heir coming into Italy, was preſented to Cicero by Hirtius and Panſa, with the ſtrongeſt profeſſions on the part of the young man that he would be governed entirely by his direction. Indeed Cicero thought it neceſſary to encourage Octavius, to keep him at a diſtance from Antony; but could not yet be perſuaded to enter heartily into his affairs. He ſuſpected his youth and want of experience; and that he had not ſtrength enough to deal with Antony; and, above all, that be had no good diſpoſition towards the conſpirators. He thought it impoſſible he ſhould ever be a friend to them; and was perſuaded rather, that if ever he got the upper hand, his uncle's acts would be more violently enforced, and his death more cruelly revenged, than by Antony himſelf. And when Cicero did conſent at laſt to unite himſelf to Octavius's intereſt, it was with no other view but to arm him with a power ſufficient to oppreſs Antony; yet ſo checked and limited, that he ſhould not be able to oppreſs the republic. In the hurry of all theſe politics, he was ſtill proſecuting his ſtudies with his uſual application; and, beſides ſome philoſophical pieces, now furniſhed his book *De Officiis*, on the duties of man, for the uſe of his ſon: A work admired by all ſucceeding ages as the moſt perfect ſyſtem of Heathen morality, and the nobleſt effort and ſpecimen of what reaſon could do in guiding man through life with innocence and happineſs. However, he paid a conſtant attention to public affairs; and did every thing that human prudence could do for the recovery of the republic; for all the vigour of its laſt efforts was entirely owing to his counſels. This appears from thoſe memorable Philippics which from time to time he publiſhed againſt Antony. But all was in vain; for though Antony's army was entirely defeated at the ſiege of Modena, yet the death of the conſuls Panſa and Hirtius in that action gave the fatal blow to all Cicero's ſchemes, and was the immediate cauſe of the ruin of the republic. Octavius having brought the ſenate to his mind, marched towards Gaul to meet Antony and Lepidus; who had already paſſed the Alps, and brought their armies into Italy, in order to have a perſonal interview with him; which had been privately concerted for ſettling the terms of a triple league, and dividing the power and provinces of Italy among themſelves. The place appointed for this interview was a ſmall iſland about two miles from Bononia, formed by the Rhine. Here they met, and ſpent a day in adjuſting the plan of their accommodation: the laſt part of which was the proſcription of their enemies. This occaſioned warm conteſts among them, till each conſented to ſacrifice ſome of his beſt friends to the reſentment of his colleagues.

(2.) **Cicero, death and character of.** Cicero was at his Tuſculan villa, when he firſt received the news of the proſcription, and of himſelf being included in it. It was the deſign of the triumvirate to keep it a ſecret, till the moment of the execution, but ſome of Cicero's friends found means to give him early notice; upon which he ſet forward to the ſea ſide, where, finding a veſſel ready, he embarked; but the winds being adverſe, after he had ſailed about two leagues along the coaſt, he was obliged to land, and ſpend a night on ſhore. Importuned by his ſervants, he went on board a ſecond time, but was ſoon after obliged to land at a country ſeat of his, a mile from the ſhore, weary of his life, and declaring he was reſolved to die in that country, which he had ſo often ſaved. Here he ſlept ſoundly, till his ſervants once more forced him away in a litter towards the ſhip, having heard that he was purſued by Antony's aſſaſſins. They were ſcarce departed, when the aſſaſſins arrived at his houſe; and, perceiving him to be fled, purſued him immediately towards the ſea, and overtook him in a wood near the ſhore. Their leader was one Popilius Lenas, a villain, whoſe life Cicero had formerly defended and ſaved. As ſoon as the ſoldiers appeared, the ſervants prepared to defend their maſter's life at the hazard of their own; but Cicero commanded them to ſet him down and make no reſiſtance. They ſoon cut off his head and his hands, which they carried to their cruel employer, Antony, who received them with joy, rewarding the murderer with a large ſum of money, and ordering the head to be fixed upon the roſtra between the two hands: a ſad ſpectacle to the city; and which drew tears from every eye, to ſee thoſe mangled members which uſed to be exerted ſo gloriouſly from that place in defence of the lives, the fortunes, and the liberties of the Roman people, ſo lamentably expoſed to the ſcorn of ſycophants and traitors. The death of the reſt, ſays an hiſtorian of that age, cauſed only a private and particular ſorrow; but Cicero's an univerſal one. It was a triumph over the republic itſelf; and ſeemed to confirm and eſtabliſh the perpetual ſlavery of Rome. Mr Swinburne, however, is of opinion, that "poſterity has been too much ſeduced by the name of Cicero, and that better citizens were ſacrificed to the jealouſy of the triumvirs without exciting ſo much indignation. If we take an impartial ſurvey of Cicero's conduct and principles, avowed in his own epiſtolary correſpondence, and trace him through all the labyrinths of his contradictory letters, we ſhall find more to blame than to admire; and diſcover, that the deſire of advancing his fortunes, and making himſelf a name, were, from his outſet in life, the only object he had in view. The good of his country, and the dictates of ſtern ſteady virtue, were not, as in Brutus and Cato, the conſtant ſprings of his actions. The misfortunes that befel him after his conſulſhip developed his character, and ſhowed him in his true colours; from that time to his death, puſillanimity, irreſolution, and unworthy repining, tainted his judgment, and perplexed every ſtep he wiſhed to take. He flattered Pompey and cringed to Cæſar, while in his private letters he abuſed them both alternately. He acknowledges in a letter to his friend, the time-ſerving Atticus, that, although he was at preſent determined to ſupport the cauſe of Rome and liberty, and to bear misfortunes like a philoſopher, there was one thing which would gain him over to the triumvirs, and that was their procuring for him the vacant augurſhip; ſo pitiful was the bribe to which he would have ſacrificed his honour, his opinion and the commonwealth. By his wavering imprudent conduct, he contributed greatly towards its deſtruction. After reproaching the conſpirators for leaving him out of the ſecret, and loading them with the moſt flattering compliments on their delivering Rome from Cæſar's tyranny, he calls Caſca an *aſſaſſin*, to pay his court to the boy Octavius, by whom he was completely duped. His praiſes of triumph are in the higheſt ſtrain of panegyric. Mark Antony well knew, that the virulent abuſe which Cicero was continually pouring out againſt him, was not an effuſion of patriotic zeal or virtuous indignation, but merely the ebullitions of perſonal hatred. He therefore cauſed Cicero to be killed, as an angry man that has been ſtung, ſtamps on a venomous animal that comes within reach of his foot. The cloak he threw over the body of Brutus, and the ſpeech he pronounced at the ſight of that hero when dead, differ widely from the treatment he gave the remains of Cicero; and ſhow, that he made a diſtinction between a Roman who oppoſed him from political motives, and one whoſe enmity aroſe from pique." *Trav. in Sicily*, Vol. II. p. 201. Cicero's death happened on the 7th of December, in the 64th year of his age, about ten days from the ſettlement of the firſt triumvirate; and with him expired the ſhort empire of eloquence among the Romans. As an orator he is thus characteriſed by Dr Blair. "In all his orations his art is conſpicuous. He begins commonly with a regular exordium; and with much addreſs prepoſſeſſes the hearers, and ſtudies to gain their affections. His method is clear, and his arguments are arranged with exact propriety. In a ſuperior clearneſs of method, he has an advantage over Demoſthenes. Every thing appears in its proper place. He never tries to move till he has attempted to convince; and in moving, particularly the ſofter paſſions, he is highly ſucceſsful. No one ever knew the force of words better than Cicero. He rolls them along with the greateſt beauty and magnificence; and in the ſtructure of his ſentences is eminently curious and exact. He is always full and flowing, never abrupt. He amplifies every thing; yet though his manner is generally diffuſe, it is often happily varied and accommodated to the ſubject. When an important public object rouſed his mind, and demanded indignation and force, he departs conſiderably from that looſe and declamatory manner to which he at other times is addicted, and becomes very forcible and vehement. This great orator, however, is not without his defects. In moſt of his orations there is too much art, even carried to a degree of oſtentation. He ſeems often deſirous of obtaining admiration rather than of operating conviction. He is ſometimes, therefore, ſhowy rather than ſolid, and diffuſe where he ought to have been urgent. His ſentences are always round and ſonorous. They cannot be accuſed of monotony, ſince they poſſeſs variety of cadence; but from too great a fondneſs for magnificence, he is on ſome occaſions deficient in ſtrength. Though the ſervices which he had performed to his country were very conſiderable, yet he is too much his own panegyriſt. Ancient manners, which impoſed fewer reſtraints on the ſide of decorum, may in ſome degree excuſe, but cannot entirely juſtify, his vanity."

* CICHORACEOUS *adj.* [from *cichorium*, Lat.] Having the qualities of ſuccory.—Diureticks evacuate the ſalt ſerum; as all acid diureticks and the teſtaceous and bitter *cichoraceous* plants. *Floyer*.

CICHORIUM, SUCCORY, a genus of the polygamia æqualis order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The receptacle is a little paleaceous; the calyx calyculated; the pappus almoſt quinquedentated, and indiſtinctly hairy. There are three ſpecies, viz.

1. CICHORIUM ENDIVIA, or ſuccory with broad crenated leaves, differs from the wild ſort (N° 2.) in its duration, being only annual, whereas the wild ſort is perennial. This ſpecies may be conſidered both as an annual and biennial plant. If ſown early in the ſpring, or even any time before the beginning of June, the plants very commonly fly up to ſeed the ſame ſummer, and periſh in autumn. If ſown in June and July, they acquire perfection in autumn, continue till the next ſpring, then ſhoot up ſtalks for flower and ſeed, and ſoon after periſh. The inner leaves are the uſeful parts. Theſe when blanched white to render them criſp and tender, and reduce them from their natural ſtrong taſte to an agreeably bitter one, are then fit for uſe. They are valued chiefly as ingredients in autumn and winter ſallads, and for ſome culinary uſes. The principal ſeaſon is from the end of Auguſt till Chriſtmas or longer, according to the temperature of the ſeaſon; though the curled kinds generally reſiſt the froſts of our ordinary winters, and remain in tolerable perfection till March or April. They are propagated by ſeeds ſown in an open ſpot of ground, from which the plants are to be removed into open beds or borders, where they may remain to grow to full ſize. The ſeaſon for ſowing them is from the beginning of June to the end of July; and to have a regular ſupply of plants, it is proper to perform 3 different ſowings, at 3 or 4 weeks interval. The great excellence of endive is to have its inner leaves finely whitened or blanched. They naturally whiten, but this whiteneſs may be greatly improved by art when the plants are arrived at full growth. Different methods are practiſed for this purpoſe, ſuch as tying the leaves together; or taking up the plants, and replanting them directly, almoſt to their tops, in ridges of dry earth, laying boards or tiles flat ways on the top of the plants; but the firſt is found to anſwer the purpoſe moſt effectually. The proper time for this is, when the leaves are almoſt full grown; or ſo far advanced that the leaves of the different plants interfere with one another, and their hearts are full and buſhy: but they are not all to be tied up at once, only a due ſupply of the largeſt and forwardeſt plants, once every 10 or 12 days according to the demand; and the blanching takes up about 3 weeks. Blanching in ridges of earth, however, is ſometimes practiſed in winter when a ſevere froſt is ſetting in; for by burying them in the earth almoſt to their tops, they are more out of the power of the cold. In November, or December, when hard weather is approaching, let a piece of light ground, that lies warm, be trenched up in one or more ſharp ridges 2 or 3 feet wide at bottom, and near as much in height, ſideways to the ſun, making the ſides as ſteep as poſſible, that the wet may run quickly off; then, in a dry day, take up a quantity of the full grown plants, with their roots entire, and diveſting them of damaged leaves, gather each plant cloſe in your hand, placing them horizontally in the ſunny ſide of the ridge of earth almoſt to their tops, and about 6 or 8 inches each way diſtant. In ſevere froſt, it will be proper to beſtow ſome covering on the plants. The qualities of the endive are nearly of the ſame kind with thoſe of the wild ſuccory. See N° 2. The ſeeds are ranked among the four leſſer cold ones.

2. CICHORIUM INTYBUS, wild ſuccory, grows naturally by the ſides of roads, and in ſhady lanes, in many places of Britain. It ſends out long leaves from the roots, from between which the ſtalks ariſe, growing to the height of 3 or 4 feet, and branching out into ſmaller ones. The flowers comes out from the ſides of the ſtalks, and are of a fine blue colour. They are ſucceeded by oblong ſeeds covered, incloſed in a down. The roots and leaves are articles of the materia medica. The former have a moderately bitter taſte, with ſome degree of roughneſs; the leaves are ſomewhat leſs bitter; and the darker coloured and more deeply jagged they are, the bitterer is their taſte. Wild ſuccory is an uſeful detergent, aperient, and attenuating medicine, acting without much irritation, tending rather to cool than to heat the body; and, at the ſame time, corroborating the tone of the inteſtines. All the parts of the plant, when wounded, yield a milky ſaponaceous juice. This, when taken in large quantities, ſo as to keep up a gentle diarrhæa, and continued for ſome weeks, has been found to produce excellent effects in ſcorbutic and other chronical diſorders.

3. CICHORIUM SPINOSUM, with a prickly forked ſtalk, grows naturally on the ſea-coaſts in Sicily, and the iſlands of the Archipelago. It ſends out from the root many long leaves which are indented on their edges, and ſpread flat on the ground; from between theſe ariſe the ſtalks, which have very few leaves, and thoſe are ſmall and entire: the ſtalks are divided in forks upward, and from between them come out the flowers, which are of a pale blue colour, and are ſucceeded by ſeeds ſhaped like thoſe of the common ſorts. The ends of the ſmaller branches are terminated by ſtar-like ſpines which are very ſharp.

* CICH PEASE. *n. ſ.* [*cicer.*] A plant.

CICINDELA, the SPARKLER, in zoology, a genus of inſects belonging to the order of coleoptera. The antennæ are ſetaceous; the jaws are prominent, and furniſhed with teeth: the eyes are a little prominent; and the breaſt is roundiſh and marginated. There are 14 ſpecies. They are in general very beautiful, and merit the attention of the curious in their microſcopic obſervations; ſome are minute, though not inferior in ſplendor, therefore beſt ſuited for the amuſement. Living ſubjects are ever preferable to dead ones. The larvæ of all this genus live under ground; and are, as well as the perfect inſects, tigers in their nature, attacking and deſtroying all they can overcome.

CICINDERA CAMPESTRIS, the field ſparkler, is one of the moſt beautiful of the genus. See *Plate* LXXV. *fig.* 3. The upper part of its body is of a fine green colour, rough, and rather bluiſh. The under ſide, the legs and antennæ, are of a ſhot colour, gold and red, of a copperiſh caſt. The eyes are very prominent, and give the head a broad appearance. The thorax is angular, and narrower than the head: which conſtitutes the character of the cicindelæ. It is rough, and of a green colour tinged with gold, as well as the head. The elytra are delicately and irregularly dotted. Each of them has 6 white ſpots, viz. one on the top of the elytrum, at its outward angle; three more along the outward edge, of which the middlemoſt forms a kind of lunula; a fifth, on the middle of the elytra, oppoſite the lunula; and that one is broader, and tolerably round; and a fixth at the extremity of the elytra. There is alſo ſometimes ſeen a black ſpot on the middle of each elytrum, oppoſite to the ſecond white ſpot. The upper lip is alſo white, as is the upper ſide of the jaws, which are very prominent and ſharp. This inſect runs with great ſwiftneſs, and flies eaſily. It is found in dry ſandy places eſpecially in the beginning of ſpring. In the ſame places its larva is met with, which reſembles a long, ſoft, whitiſh worm, armed with ſix legs, and a brown ſcaly head. It makes a perpendicular round hole in the ground, and keeps its head at the entrance of the hole to catch the inſects that fall into it; a ſpot of ground is ſometimes entirely perforated in this manner.

CICISBEO, an Italian term, which ſignifies a *whiſperer*; and has been beſtowed in Italy on lovers in general, but chiefly on thoſe who attend on married ladies with as much attention and reſpect as if they were their lovers. This cuſtom, originally Italian, but which is by no means confined to Italy, having taken place not only in the effeminate countries of Europe, but among the hardy Auſtrians. (See AUSTRIANS,) and even among the jealous Spaniards, has been mentioned with juſt deteſtation by many authors; yet Mr Baretti has taken great pains to vindicate it. He aſcribes it to a ſpirit of gallantry, derived from the ages of chivalry, and much heightened and refined by the revival of the Platonic philoſophy in Italy, about the 13th century; and by the verſes of Petrarch in compliment to the beautiful Laura, and his numerous imitators. But, be the origin of it what it may, it doubtleſs opens a wide field for immorality of the worſt kind.

CICLUCH, CICLUI, or CICLUT, a ſtrong frontier town of Dalmatia, ſituated on the river Norentha. It is ſurrounded with walls built in the ancient manner, and was taken by the Venetians from the Turks in 1694. Lon. 17. 40. E. Lat. 45. 20. N.

CICONES, an ancient people of Thrace near the Hebrus. Ulyſſes at his return from Troy conquered them, and plundered their chief city Iſmarus. They tore to pieces Orpheus for his obſcene indulgencies.

* To **CICURATE**. *v. a.* [*cicuro*, Lat.] To tame: to reclaim from wildneſs: to make tame and tractable.—Poiſons may yet retain ſome portion of their natures; yet are ſo refracted, *cicurated*, and ſubdued, as not to make good their deſtructive malignities. *Crown.*

* **CICURATION**. *n. ſ.* [from *cicurate*.] The act of taming or reclaiming from wildneſs.—This holds not only in domeſtick and manſuete birds, for then it might be the effect of *cicuration* or inſtitutions; but in the wild. *Ray.*

(I) **CICUTA**, in antiquity, properly ſignifies an hollow intercepted between two knots, of the ſtalks or reeds of which the ancient ſhepherds uſed to make their pipes. It is now however, generally uſed to ſignify the water hemlock, (See § III.) and alſo the common ſort: but Linnæus has deſcribed the latter under the old name of CORIUM. See that article.

(II.) CICUTA is alſo uſed, chiefly among the ancients, for the juice expreſſed from the water hemlock, the common poiſon wherewith the ſtate criminals at Athens were put to death. Some ſay, that this poiſonous draught was an inſpiſſated juice compounded of the juice of cicuta and ſome other corroſive herbs. Socrates drank the cicuta. Plato in his dialogue on the immortality of the ſoul, obſerves, that "The executioner adviſed Socrates not to talk, for fear of cauſing the cicuta to operate too ſlowly." M. Petit, in his *Obſervationes Miſcellaneæ*, remarks, that this advertiſement was not given by the executioner out of humanity, but to ſave the cicuta: for he was only allowed ſo much poiſon per annum, which, if he exceeded, he was to furniſh at his own expenſe. This conſtruction is confirmed by a paſſage in Plutarch: the executioner who adminiſtered the cicuta to Phocion, not having enough, Phocion gave him money to buy more; obſerving by the way, "that it was odd enough, that at Athens a man muſt pay for every thing, even for his own death."

(III.) CICUTA, in botany, WATER HEMLOCK, a genus of the order digynia, belonging to the pentandria claſs of plants; and ranking in the natural method under the 45th order, *Umbellatæ*. There are 3 ſpecies; viz.

1 CICUTA BULBIFERA;

2. CICUTA MACULATA: and

3. CICUTA VIROSA. This ſpecies is the only one remarkable, and that from the poiſonous qualities of its roots, which have been often known to deſtroy children who eat them for parſnips.

CID, Roderigo Dias LE, a Caſtilian officer who was very ſucceſsful againſt the Moors, under Ferdinand II. king of Caſtile; but whoſe name would hardly have been remembered, if Corneille had not made his paſſion for Chimene the ſubject of an admired tragedy, founded on a ſimple but affecting incident. Le Cid is deſperately in love with Chimene, daughter of the Count de Gomes: but he is at variance with the Count: and being challenged by him kills him in a duel. The conflict between love and honour in the breaſt of Chimene, who at length pardons and marries the Cid, forms the beauty of the piece. He died in 1689.

CIDARIS, in antiquity, the mitre uſed by the Jewiſh high prieſts. The Rabbins ſay, that the bonnet uſed by the prieſts in general was made of a piece of linen cloth 16 yards long, which covered their heads like a helmet or turban: and they allow no other difference between the high prieſt's bonnet and that of other prieſts, than that the one is flatter, and more in the form of a turban; whereas that worn by ordinary prieſts roſe ſomething more in a point.

* CIDER. *n. ſ.* [*cidre*, Fr. *ſidra*, Ital. *ſicera*, Lat. *σίκερα*, שכר.] 1. All kinds of ſtrong liquors, except wine. This ſenſe is now wholly obſolete. 2. Liquor made of the juice of fruits preſſed.—We had alſo drink, wholeſome and good wine of the grape, a kind of *cider* made of the fruit of that country; a wonderful pleaſing and refreſhing drink. *Bacon.* 3. The juice of apples expreſſed and fermented. This is now the ſenſe.—

To the utmoſt bounds of this
Wide univerſe of Silurian *cider* born,
Shall pleaſe all taſtes, and triumph o'er the vine.
Philips.

* CIDERIST. *n. ſ.* [from *cider*.] A maker of cider.—When the *ciderists* have taken care for the beſt fruit, and ordered them after the beſt manner they could, yet hath their cider generally proved pale, ſharp, and ill taſted. *Mortimer.*

* CIDERKIN. *n. ſ.* [from *cider*.] A low word uſed for the liquor made of the murk or groſs matter of apples, after the cider is preſſed out, and a convenient quantity of boiled water added to it; the whole infuſing for about forty-eight hours. *Philips.*—*Ciderkin* is made for common drinking, and ſupplies the place of ſmall beer. *Mortimer.*

CI-DEVANT. *adj.* [from *ci-devant*, Fr. before or heretofore.] a French word now pretty generally adopted into the Engliſh language, to expreſs an idea ſomewhat different from, though analogous to, *late*, or *former*; and to ſignify that the perſon, thing or place, to which it is applied, is in a ſtate different from what they were in in a ſhort time before. We are far from approving of the practice of many modern Engliſh writers, who conſtantly interlard their works with French words and phraſes, where there is not the ſmalleſt uſe or neceſſity for them. This is a ſpecies of modern pedantry, as ridiculous, as that, which greatly prevailed among authors about a century or two ago, of loading their works upon all occaſions with Greek and Latin quotations and adages. The late Lord Cheſterfield, in his *Letters to his Son*, has juſtly expoſed this pedantry; yet his lordſhip at the very ſame time fell into a ſimilar impropriety, by interſperſing his works upon all occaſions with French phraſes, and large quotations in that language. And his lordſhip's example has not only been followed by numberleſs imitators in the claſs of authors, but even in ſome degree by the compilers of our newſpapers; who, inſtead of the good old Engliſh names, *Lewis John*, &c. conſtantly inſert *Louis Jean*, and the like. From theſe obſervations the reader will perceive, that it is from no predilection in favour of the French language, that we approve of the adoption of the word *ci-devant*. The Engliſh language is perhaps as complete and even copious, as any of Europe, but it has no ſynonyme now in uſe, that exactly expreſſes, without circumlocution or ambiguity, the idea conveyed by the word *ci-devant*, when applied to a perſon, office, place, or the like, whoſe condition, title, or government, is altered from what it lately was. For inſtance, were we to mention the *ci-devant doge of Genoa*, but inſtead of uſing the French term, to expreſs the idea in Engliſh, we muſt either ſay the *former*, or the *late* doge. But the Engliſh idiom of *former* naturally leads to the idea of a *later*; and the word *late* is ſo frequently uſed for *deceaſed*, that in adopting a word of ſuch ambiguity, the reader or hearer is left quite uncertain, whether the doge is dead or alive. In ſhort, the only Engliſh word, that comes neareſt to the idea expreſſed by the word *ci-devant* is *heretofore*; but this is a word ſo much out of uſe, if not quite obſolete, that an author, who ſhould now uſe it, inſtead of *ci-devant*, would be reckoned a very antiquated and unfaſhionable writer.

CIEKANOW, a town of Poland, in the palatinate of Maſovia, 40 miles N. of Warſaw.

* CIELING. *n. ſ.* See Ceiling.

* CIERGE. *n. ſ.* [French.] A candle carried in proceſſions.

CIEUFANG, a river in China, which falls into the Pacific Ocean at Han-tcheon.

CIEUX, a town of France, in the department of Upper Vienne, and chief place of a canton, in the diſtrict of Bellac, containing about 1200 inhabitants. It 13 miles NW. of Limoges.

CIFALEDI, } Cefalu, a town of Sicily, [illegible]
CIFALAU, or } miles E. of Palermo. See Cefalu.

CIFUENTES, a town of Spain, in New Caſtile; 22 miles S. of Siguença.

CIGNANI, Charles, an Italian painter, born at Bologna in 1628; and the diſciple of Albani. He was eſteemed by pope Clement XI, who nominated him prince of the academy of Bologna, and loaded him with favours. He died at Forli in 1719. The cupola of Madona del Focca at Forli, in which he repreſented Paradiſe, is an admirable work. His principal pictures are at Rome, Bologna, and Forli.

CIGOLI, or Civoli. See Cardi and Civoli.

CILIA, the eye-lashes. See Anatomy, *Index*.

* CILIARY. *adj* [*cilium*, Lat.] Belonging to the eyelids.—The *ciliary* proceſſes, or rather the ligaments, obſerved in the inſide of the ſclerotic tunicles of the eye, do ſerve inſtead of a muſcle, by the contraction, to alter the figure of the eye. *Ray.*

CILIATED leaf, among botanical writers, one ſurrounded with parallel filaments ſomewhat like the hairs of the eye lids.

(1.) CILICIA, an ancient kingdom of Aſia, ing between 36° and 40° Lat. N. bounded on the E. by Mount Amanus, which ſeparates it from Syria; on the W. by Phamphylia; on the N. by Iſauria, Cappadocia, and Armenia Minor; and by the Mediterranean ſea, on the S. It is ſo ſurrounded by ſteep and craggy mountains, particularly the Taurus and Amanus, that it may be defended by a handful of reſolute men againſt a numerous army, there being but 3 narrow paſſes leading into it, commonly called *Pylæ Ciliciæ*, or the gates of Cilicia; viz. the *Paſs of Mount Taurus* on the ſide of Cappadocia; the *Paſs of Mount Ammanus*, and the *Paſs of Syria*. Its principal rivers are the Cydnus and the Pyramus. According to Joſephus, Cilicia was firſt peopled by Tarſhiſh the ſon of Javan, and his deſcendants, whence the whole country was named Tarsus. The ancient inhabitants were in proceſs of time driven out by a colony of Phœnicians, who, under Cilix, firſt ſettled in the iſland of Cyprus, and from thence paſſed into the country which, from their leader, they called *Cilicia*. Afterwards, ſeveral other colonies from different nations ſettled in this kingdom, particularly from Syria and Greece; whence the Cilicians in ſome places uſed the Greek tongue, in others the Syriac; but the former greatly corrupted by the Perſian, the predominant language of the country being a dialect of that tongue. We find no mention of the kings of Cilicia after their ſettlement in that country, till the time of Cyrus, to whom they volutnarily ſubmitted, continuing ſubject to the Perſians till the overthrow of that empire; but governed to the time of Artaxerxes Menmon, by kings of their own nation. After the downfal of the Perſian empire, Cilicia became a province of Macedon; and, on the death of Alexander, fell to the ſhare of Seleucus, and continued under his deſcendants till it was reduced to a Roman province by Pompey. As a proconſular province, it was firſt governed by Appius Claudius Pulcher; and after him by Cicero, who reduced ſeveral ſtrong holds on Mount Amanus, in which ſome Cilicians had fortified themſelves, and held out againſt his predeceſſor. On this occaſion Cilicia was divided into *Trachæ* and *Campeſtris*.

1. Cilicia campestris, according to Ammianus Marcellinus, was one of the moſt fruitful countries of Aſia: but the weſtern part was very barren, though famous, even to this day, for an excellent breed of horſes, of which 600 are yearly ſent to Conſtantinople, for the ſpecial uſe of the Grand Signior. The air in the inland parts is reckoned wholeſome; but that on the ſea-coaſt is dangerous, eſpecially to ſtrangers. This part of Cilicia was made a Roman province, and called *Cilicia prima*.

2. Cilicia trachæa, was governed by kings appointed by the Romans, till the reign of Veſpaſian, when, the family of Tracondementus being extinct, it was made a province of the empire, and was divided into *Cilicia Secunda*, comprehending the coaſt of Cilicia Trachæa, and Isauria, containing the inland parts. It is now a province of Aſiatic Turkey; and is called Caramaina, having been the laſt province of the Caramanian kingdom which held out againſt the Ottoman race. It was called Τραχεια, *Aſpera* or *Stony*, from its bounding with ſtones; and the whole province is ſtill called by the Turks, *Tas Wileieth*, or *The Stony Province*.

(II.) Cilicia terra, in ancient natural hiſtory, a bituminous ſubſtance improperly called an earth, which, by boiling, became ough like birdlime, and was uſed inſtead of that ſubſtance, to cover the ſtock of the vines for preſerving them from worms. It probably ſerved in this office in a ſort of double capacity, driving away theſe animals by its nauceous ſmell, and entangling them if they chanced to get amongſt it.

CILICIANS, the inhabitants of Cilicia. According to the Greek and Roman hiſtorians, they were a rough unpoliſhed race of people, unfair in their dealings, cruel, and liars even to a proverb. In the Roman times, they became greatly addicted to piracy. They firſt began, in the time of the Mithridatic war, to infeſt the neighbouring provinces along with the Pamphylians; and, being emboldened with ſucceſs, they ſoon ventured as far as the coaſts of Greece and Italy, where they took a vaſt number of ſlaves, whom they ſold to the Cypriots and the kings of Egypt and Syria. They were, however, at laſt defeated and entirely ſuppreſſed by Pompey the Great. See Rome, history of.

* CILICIOUS. *n. ſ.* from [*cilicium*, hair-cloth, Lat.] Made of hair.—A garment of camel's hair; that is, made of ſome texture of that hair, a coarſe garment, a *cilicious* or ſackloth habit, ſuitable to the auſterity of his life. *Brown*.

CILICIUM, in Hebrew antiquity, ſort of habit made of coarſe ſtuff, formerly in uſe among the Jews in times of mourning and diſtreſs. It is the ſame with what the Septuagint and Hebrew verſions call ſackloth.

ÇILLA'BHRUIC, [*i. e.* St Broke's pariſh,] the Gaelic name of the pariſh of Rothsay.

CILLEY, a town of Germany, in the duchy of Stiria, on the river Saan, and capital of a diſtrict, which extends as far as Petaw. The inhabitants of the town ſpeak German and Sclavonian, but thoſe of the villages only the latter. Some authors are of opinion that they were originally brought there by the dukes of Bavaria, to oppoſe the Romans; others, that they eſtabliſhed themſelves. The diſtrict or country was once an independent principality, and governed by counts of its own. It has a conſiderable trade in merchandiſe going to and from Vienna and Trieſt. The Saan here receiving the Koding, becomes navigable. Cilley lies 58 miles S. by W. of Gratz, and 130 SSW. of Vienna. Lon. 33. 2. E Ferro. Lat. 46. 21. N.

CILOCA, a town of South America, in the country of Peru, on the coaſt of the Pacific ocean, 40 miles W. of Arequipa.

CILURNUM, an ancient town of Britain, thought to be Collerton, or Collerford, in Northumberland; but according to Camden, Walwick, or Scilieceſter.

CIMA, or Cyma, in architecture, the ſame with Cymatium, or Ogee. See Architecture, *Index*.

CIMABUE, Giovani, a renowned painter, born at Florence in 1240, and the firſt who revived the art in Italy. He painted, according to the cuſtom

tom of thoſe times, in freſco and in diſtemper; colors in oil not being then found out. He excelled in architecture as well as in painting; and was concerned in the fabric of Sancta Maria del Fior at Florence: during which employment he died at the age of 60, and left many diſciples.

* CIMAR. See SIMAR.

CIMBRI, or CIMBRIANS, an ancient Celtic nation, who inhabited the northern parts of Germany. They are ſaid to have been deſcended from the Aſiatic CIMMERIANS, and to have taken the name of *Cimbri* when they changed their old habitations. When they firſt became remarkable, they inhabited chiefly the peninſula, now called *Jutland*, and by the ancients CIMBRICA CHERSONSUS. About 113 years before Chriſt, they left their peninſula with their wives and children: and joining the Teutones, a neighbouring nation, took their journey ſouthward in queſt of a better country. They firſt fell upon the Boii, a Gauliſh nation ſituated near the Hercynian foreſt. Here they were repulſed, and obliged to move nearer the Roman provinces. The republic being then alarmed at the approach of ſuch multitudes of barbarians, ſent an army againſt them under the conſul Papirius Carbo. On the approach of the Roman army, the Cimbri made propoſals of peace. The conſul pretended to accept it; but having thrown them into a diſadvantageous ſituation, treacherouſly attacked their camp. His perfidy was rewarded as it deſerved; the Cimbri ran to arms, and not only repulſed the Romans, but attacking them in their turn, utterly defeated them, and obliged the ſhattered remains of their forces to conceal themſelves in the neighbouring foreſts. After this victory the Cimbri entered Tranſalpine Gaul, which they quickly filled with ſlaughter and deſolation. Here they continued 5 or 6 years, when another Roman army under the conſul Silanus, marched againſt them. This general met with no better ſucceſs than his predeceſſor. His army was routed at the firſt onſet; in conſequence of which, all Narbonne Gaul was expoſed at once to the ravages of theſe barbarians. About A. A. C. 105, the Cimbri began to threaten the Roman empire itſelf with deſtruction. The Gauls marched from all parts with a deſign to join them and invade Italy. The Roman army was commanded by the proconſul Cæpio, and the conſul Mallius; but as theſe two commanders could not agree, they were adviſed to ſeparate, and divide their forces. This advice proved the ruin of the whole army. The Cimbri immediately fell upon a ſtrong detachment of the conſular army commanded by M. Aurelius Scaurus, which they cut off to a man and made Scaurus himſelf priſoner. Mallius being greatly intimidated by this defeat, deſired a reconciliation with Cæpio, but was haughtily refuſed. He moved nearer the conſul, however, with his army, that the enemy might not be defeated without his having a ſhare in the action. The Cimbri by this movement, imagining the commanders had made up their quarrel, ſent ambaſſadors to Mallius with propoſals of peace. As they could not help going through Cæpio's camp, he ordered them to be brought before him; but finding they were empowered to treat only with Mallius, could ſcarce be reſtrained from putting them to death. His troops, however, forced him to confer with Mallius about the propoſals ſent by the barbarians: but as Cæpio went to the conſul's tent againſt his will, ſo he oppoſed him in every thing: contradicted with great obſtinacy and inſulted him in the groſſeſt manner. The deputies on their return acquainted their countrymen that the miſunderſtanding between the Roman commanders ſtill ſubſiſted; upon which the Cimbri attacked the camp of Cæpio, and the Gauls that of Mallius. Both were forced, and the Romans ſlaughtered without mercy. Eighty thouſand citizens and allies of Rome, with 40,000 ſervants and ſutlers, periſhed on that fatal day, in ſhort, of the two Roman armies only 10 men, with the two generals, eſcaped to carry the news of ſo dreadful a defeat. The conquerors deſtroyed all the ſpoil, purſuant to a vow they had made before the battle. The gold and ſilver they threw into the Rhone, drowned the horſes they had taken, and put to death all the priſoners. The Romans were thrown into the utmoſt conſternation on the news of ſo terrible an overthrow. They ſaw themſelves threatened with a deluge of Cimbri and Gauls, numerous enough to over-run the whole country. They did not, however deſpair. A new army was raiſed with incredible expedition; no citizen whatever who was fit to bear arms being exempted. On this occaſion alſo, fencing maſters were firſt introduced into the Roman camp; by which means the ſoldiers were ſoon rendered in a manner invincible. Marius, who was at that time in high reputation on account of his victories in Africa, was choſen commander, and waited for the Cimbri in Tranſalpine Gaul; but they had reſolved to enter Italy by two different ways; the Cimbri over the eaſtern, and the Teutones and other allies over the weſtern Alps. The Roman general therefore marched to oppoſe the latter, and defeated the Ambrones and the Teutones with great ſlaughter. See AMBRONES, and TEUTONES. The Cimbri, in the mean time, entered Italy, and ſtruck the whole country with terror. Catullus and Sylla attempted to oppoſe them; but their ſoldiers were ſo intimidated by the fierce countenances and terrible appearance of theſe barbarians, that nothing could prevent their flying before them. The city of Rome was now totally defenceleſs; and, had the Cimbri only marched briſkly forwards, they had undoubtedly become maſters of it; but they waited in expectation of being joined by their allies, the Ambrones and Teutones, not having heard of their defeat by Marius, till the ſenate had time to recal him to the defence of his country. By their order he joined his army to that of Catullus and Sylla: and upon that union was declared commander in chief. The Roman army conſiſted of 52,3000 men. The cavalry of the Cimbri were no more than 15,000, but their foot ſeemed innumerable; for, being drawn up in a ſquare, they are ſaid to have covered 30 furlongs. The Cimbri attacked the Romans with the utmoſt fury; but, being unaccuſtomed to bear the heats of Italy, they ſoon began to loſe their ſtrength, and were eaſily overcome. But they had put it out of their power to fly; for, that they might keep their ranks the better, they had, like true barbarians, tied themſelves together with cords faſtened to their belts, ſo that the Romans made a terrible havock of them. The battle was therefore ſoon over, and the whole day employed only in the moſt terrible butchery; 120,000 were killed on the field of battle, and 60,000 taken priſoners. The victorious Romans then marched to the enemy's camp; where they had a new battle to fight with the women, whom they found more fierce than even their huſbands had been. See Ambrones. The greateſt part of them hanged themſelves on trees. One of them was found hanging at a cart with two of her children at her heels. Many of the men, for want of trees and ſtakes, tied ſtrings in running knots about their necks, and faſtened them to the tails of their horſes, and the horns and feet of their oxen, in order to ſtrangle themſelves; and thus the whole multitude was deſtroyed. The country of the Cimbri, which, after this terrible cataſtrophe, was left a mere deſart, was again peopled by the Scythians.

CIMBRICA chersonesus. See Chersonesus, N° 2.

CIMBRISHAM, a ſea port town of Sweden, in the province of Schonen in Gothland, with a harbour ſeated on the Baltic. From this place and the adjacent country, the ancient Cimbri emigrated. Lon. 17. 5. E. Lat. 56. 40. N.

CIMEGES, a town of France, in the department of Dordogne, and chief place of a canton, in the diſtrict of Bergerac; 7 miles SW. of Bergerac.

* CIMELIARCH. *n. ſ.* from κειμηλιαρχης.] The chief keeper of plate, veſtments, and things of value belonging to a church; a church-warden.

CIMEN-SHORE, a town in Suſſex, near Wetterling in the iſle of Selſey.

* CIMETER. *n. ſ.* [*cimitarra*, Span and Portug. from *chimeteir*, Turkiſh. *Bluteau's Portugueſe Dictionary*.] A ſort of ſword uſed by the Turks; ſhort; heavy; and recurvated, or bent backward. This word is ſometimes erroneouſly ſpelt *ſcimitar*, and *ſcymeter*; as in the following examples.—

By this *ſcimitar*,
That ſlew the ſophy and a Perſian prince,
That won three fields of ſultan Solyman. *Shak.*

Our armours now may truſt, our idle *ſcymiters*
Hang by our ſides for ornament, not uſe. *Dryd.*

CIMEX, the Bug, in zoology, a genus of inſects belonging to the order of hemiptera. The roſtrum is inflected. The antennæ are longer than the thorax. The wings are folded together croſswiſe; the upper ones are coriaceous from their baſe towards their middle. The back is flat; the thorax margined. The feet are formed for running. See *Plate* LXXV, *fig.* 4. This genus is divided into different ſub-diviſions, as follows: 1. Thoſe without wings. 2. Thoſe in which the eſcutcheon is extended ſo far as to cover the abdomen and the wings. 3. The coleoptrati, whoſe elytra are wholly coriaceous. 4. Thoſe whoſe elytra are membranaceous; theſe are very much depreſſed like a leaf. 5. In which the thorax is armed on each ſide with a ſpine. 6. Thoſe which are of an oval form, without ſpines on the thorax. 7. In which the antennæ become ſetaceous towards their point. 8. Thoſe of an oblong form. 9. Thoſe whoſe antennæ are ſetaceous, and as long as the body. 10. Thoſe which have their thighs armed with ſpines. 11. Thoſe whoſe bodies are long and narrow. Linnæus enumerates no fewer than 121 ſpecies, to which ſeveral have been added by other naturaliſts. The larvæ of bugs only differ from the perfect inſect by the want of wings; they run over plants; grow and change to chryſalids, without appearing to undergo any material difference. They have only rudiments of wings, which the laſt transformation unfolds, and the inſect is then perfect. In the two firſt ſtages they are unable to propagate their ſpecies. In their perfect ſtate, the female, fecundated, lays a great number of eggs, which are often found upon plants, placed one by the ſide of another; many of which, viewed through a glaſs, preſent ſingular varieties of configuration. Some are crowned with a row of ſmall hairs, others have a circular fillet; and moſt have a piece which forms a cap; this piece the larva puſhes off when it forces open the egg. Releaſed from their priſon, they overſpread the plant on which they feed, extracting by the help of the roſtrum, the juices appropriated for their nouriſhment; even in this ſtate the larvæ are not all peaceably inclined; ſome are voracious in an eminent degree, and ſpare neither ſex nor ſpecies they can conquer. In their perfect ſtate they are mere cannibals, glutting themſelves with the blood of animals: they deſtroy caterpillars, flies, and even the coleopterous tribe, whoſe hardneſs of elytra one would imagine was proof againſt their attacks, have fallen an eaſy prey to the ſharp piercing nature of the roſtrum of the bug, and the uncautious naturaliſt may experience a feeling proof of the ſeverity of its nature.

1. Cimex lectularius, the house bug, is particularly acceptable to the palate of ſpiders in general, and is even ſought after by wood bugs; which is not indeed ſurpriſing, when the general voracity of this genus is conſidered. The methods of expelling houſe bugs are various, as oil of turpentine, the ſmoke of corn mint, of narrow leaved wild creſs, of herb-robert, of the reddiſh agaric, of muſtard, Guinea pepper, peats or turf, &c. See Bug, and Cimicifuga.

2. Cimex paradoxus, a very peculiar ſpecies, diſcovered by Dr Sparman at the Cape. He obſerved it as at noon tide he ſought for ſhelter among the branches of a ſhrub from the intolerable heat of the ſun. Though the air (ſays he) was extremely ſtill and calm, ſo as hardly to have ſhaken an aſpen leaf, yet I thought I ſaw a little withered, pale, crumpled leaf, eaten as it were by caterpillars, flittering from the tree. This appeared to me ſo very extraordinary, that I thought it worth my while ſuddenly to quit my verdant bower in order to contemplate it; and I could ſcarcely believe my eyes, when I ſaw a live inſect, in ſhape and colour reſembling the fragment of a withered leaf, with the edges turned up and eaten away, as it were by caterpillars, and at the ſame time all over beſet with prickles. Nature by this peculiar form, has certainly extremely well defended and concealed, as it were in a maſk, this inſect from birds and its other diminutive foes; in all probability with a view to preſerve it, and employ it for ſome important office in the ſyſtem,

of her economy; a ſyſtem with which we are too little acquainted, in general too little inveſtigate and, in every part of it, can never ſufficiently admire, with that reſpect and veneration which we owe to the great Author of nature and Ruler of the univerſe." See *Plate* LXXV. *fig.* 5.

CIMICIFUGA, in botany: A genus of the polyandria order, belonging to the diœcia claſs of plants. The male calyx is almoſt pentaphyllous; there is no corolla; the ſtamina are 20 in number: the female calyx is almoſt pentaphyllous; no corolla; the ſtamina 20 and barren: the capſules from 4 to 7, polyſpermous. Meſſerſchimidius, in the Iſis Siberica, gives it the following character and name:

CIMICIFUGA FOETIDA, with the leaves of the herb Chriſtopher, bearing a thyrſis of yellow male flowers with a red villous ſeed, the ſeed veſſel in form of a horn. This whole plant ſo reſembles the *actea racemoſa*, that it is difficult to diſtinguiſh them when not in flower; but in the fructification it greatly differs from it, the cimicifuga having 4 piſtils, the actea but one. Jacquin ſays, that it is a native of the Carpathian mountains. It has obtained the name of *cimicifuga*, or *bugbane*, both in Siberia and Tartary, from its property of driving away thoſe inſects; and the botaniſts of thoſe parts of Europe, which are infeſted by them, have long deſired to naturaliſe it in their ſeveral countries. Gmelin mentions, that in Siberia the natives alſo uſe it as an evacuant in dropſy; and that its effects are violently emetic and draſtic.

(1.) **CIMMERII**, an ancient people near the Palus Mæotis. They invaded Aſia Minor 1284 years before Chriſt, and ſeized on the kingdom of Cyaxares. After they had been maſters of the country for 28 years, they were driven back by Aylattes king of Lydia.

(2.) **CIMMERII**, another ancient nation, on the weſtern coaſt of Italy. The country which they inhabited was ſuppoſed to be ſo gloomy, that to expreſs a great obſcurity, the expreſſion of *Cimmerian darkneſs* has proverbially been uſed; and Homer, according to Plutarch, drew his images of hell and Pluto from the gloomy and diurnal country where they dwelt. See CIMMERIUM, N° 2.

(1.) **CIMMERIUM**, in ancient geography, a town at the mouth of the Palus Mæotis; from which the Boſphorus Cimmerius is named; that ſtrait which joins the Euxine and the Palus Mæotis. And here ſtood the *Promontorium Cimmerium*; and hence probably the modern appellation CRIM.

(2.) **CIMMERIUM**, a place near Baiæ, in Campania, where formerly ſtood the cave of the ſibyl. The people, (See CIMMERII, N° 2) lived in ſubterraneous habitations, from which they iſſued in the night to commit robberies and other acts of violence, and thus never ſaw the light of the ſun. To give a natural account of this fable, Feſtus ſays, there was a valley ſurrounded with a pretty high-ridge, which precluded the morning and evening ſun.

(1.) **CIMOLA**, or CIMOLIA TERRA, in natural hiſtory, fuller's earth. See CLAY and FULLER'S EARTH.

(2.) **CIMOLIA ALBA**, the officinal name of the earth of which we now make tobacco pipes. Its diſtinguiſhing characters are, that it is a denſe, compact, heavy earth of a dull white colour, and very cloſe texture; it will not eaſily break between the fingers, and ſlightly ſtains the ſkin in handling. It adheres firmly to the tongue; melts very ſlowly in the mouth, and is not readily diffuſible in water. It is found in many places. That of the Iſle of Wight is much eſteemed for its colour. Great plenty of it is found near Pole in Dorſetſhire, and near Wedenſbury in Staffordſhire.

(3.) **CIMOLIA NIGRA** is of a dark lead colour, hard, dry, and heavy; of a ſmooth compact texture, and not viſcid: it does not colour the hands; crumbles when dry; adheres to the tongue; diffuſes ſlowly in water; and is not acted upon by acids. It burns perfectly white, and acquires a conſiderable hardneſs. The chief pits for this clay are near Northampton, where it is uſed in the manufacture of tobacco-pipes. It is alſo mixed with the critche clay of Derbyſhire, in the proportion of one part to three, in the manufacture of the hard reddiſh brown ware.

(4.) **CIMOLIA TERRA**, in natural hiſtory; a name by which the ancients expreſſed a very valuable medicinal earth; but which latter ages have ſuppoſed to be no other than our tobacco-pipe clay and fuller's earth. The cimolia terra of the ancients was found in ſeveral of the iſlands of the Archipelago; particularly in the iſland of CIMOLUS from whence it has its name. It was uſed with great ſucceſs in the eryſipelas, inflammations and the like, being applied by way of cataplaſm to the part. They alſo uſed it, as we do CIMOLIA, or fuller's earth, for the cleanſing of clothes. This earth of the ancients, though ſo long diſregarded, and by many ſuppoſed to be loſt, is yet very plentiful in ARGENTIERE, Sphanto, and many of thoſe iſlands. It is a marl of a lax and crumbly texture, and a pure bright white colour, very ſoft to the touch. It adheres firmly to the tongue; and, if thrown into water, raiſes a little hiſſing and ebullition, and moulders to a fine powder. It makes a conſiderable effervefcence with acids; and ſuffers no change of colour in the fire. These are the characters of what the ancients called ſimply *terra cimolia*: but beſides this, they had, from the ſame place, another earth which they called by the ſame general name, but diſtinguiſhed as follows:

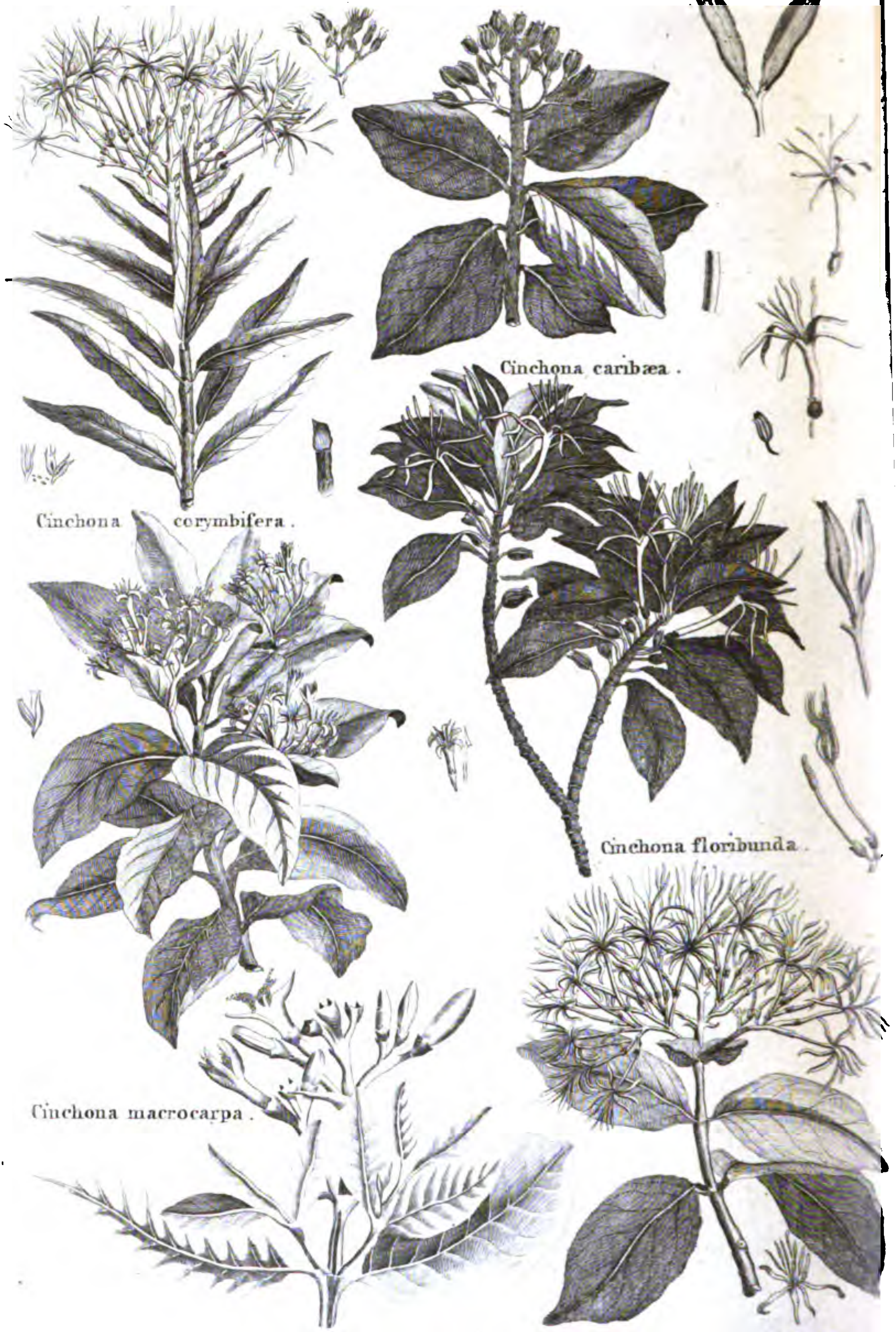
(5.) **CIMOLIA TERRA PURPURESCENS**, the purple cimolia. This they deſcribed to be fattiſh, cold to the touch, of a mixed purple colour, and nearly as hard as a ſtone. And this was evidently the ſubſtance we call STEATITES, or the SOAP ROCK; common in Cornwall, and alſo in the iſland of Argentiere.

CIMOLUS, in ancient geography, one of the Cyclades, now called ARGENTIERE. See ARGENTIERE, N° 1.

CIMON, a celebrated Athenian general, the ſon of Miltiades and Hegeſipyle. He was famous for his debaucheries in his youth, and the reformation of his morals when arrived to years of diſcretion. He behaved with great courage at the battle of Salamis, and rendered himſelf popular by his munificence and valour. He defeated the Perſian fleet, took 200 ſhips, and totally routed their land army, the very ſame day. A. U. C. 284. Cimon thus gained great wealth both to the

CINCHONA, PERUVIAN BARK.

Plate LXXII



Cinchona angustifolia.

Cinchona brachycarpa.

Cinchona caribæa.

Cinchona corymbifera.

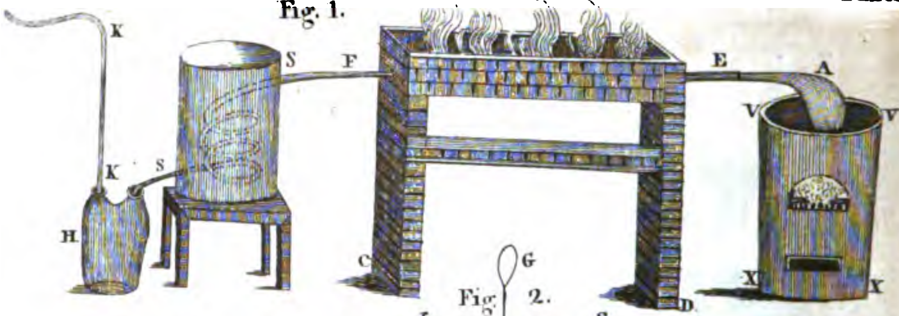
Cinchona floribunda.

Cinchona macrocarpa.

[illegible]

CHEMISTRY. Plate LXXIII.

Fig. 1.



Pelican Fig 3

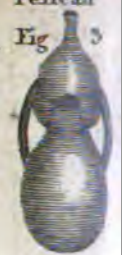


Fig 2.

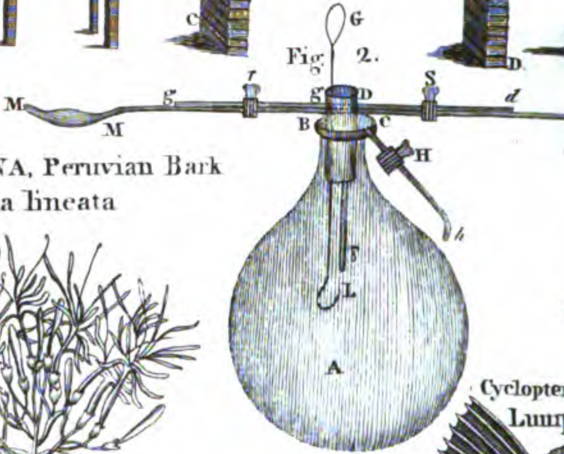
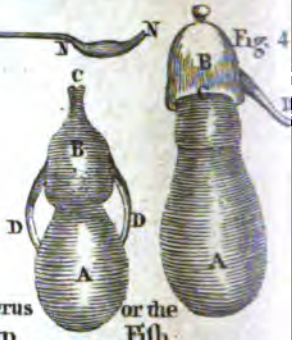
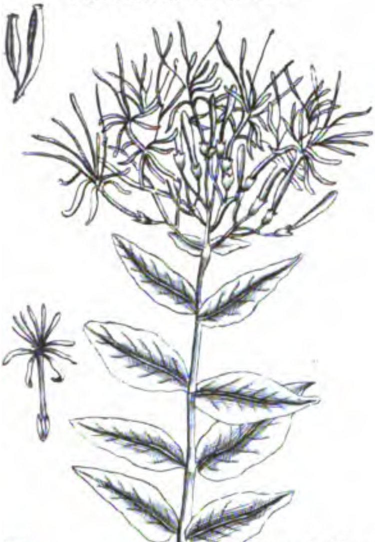


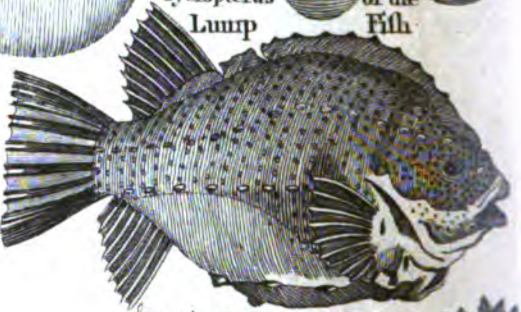
Fig. 4



CINCHONA, Peruvian Bark
Cinchona lineata



Cyclopterus Lump or the Fish



Bark Tree of Tecamez

Cinchona officinalis

Concha Margaritifera

Cylindrus

T. Clark Sculpt Edinr.

public and to himſelf. In his public character he had behaved with unimpeached honeſty, and as a private citizen he dedicated his wealth to the moſt excellent purpoſes. He demoliſhed the incloſures about his grounds and gardens, permitting every one to enter and take what fruits they pleaſed; he kept an open table, where both rich and poor were plentifully entertained. If he met a citizen in a tattered ſuit of clothes, he made ſome of his attendants exchange with him; or if the quality of the perſon rendered that kindneſs unſuitable he cauſed a ſum of money to be privately given him. All this, however, was not ſufficient: he did not concur with every meaſure of the commonalty; and therefore the popular party determined not to baniſh him, but to put him to death. The crime laid to his charge was, that by preſents from the Macedonians he was prevailed upon to let ſlip a manifeſt opportunity of enlarging his conqueſts, after taking from the Perſians the gold mines of Thrace. Elpinice, Cimon's ſiſter, uſed all her intereſt in his behalf, and among others ſpoke to Pericles the celebrated orator. He was indeed Cimon's rival, and had no doubt aſſiſted in ſtirring up the proſecution againſt him; but he did not deſire his death: and, therefore, though appointed to accuſe him, Pericles ſpoke in ſuch a manner, that it plainly appeared he did not think him guilty; and in conſequence of this Cimon was only baniſhed by the oſtraciſm. He was afterwards recalled from his exile; and at his return he made a reconciliation between Lacedemon and his countrymen; after which he totally ruined the Perſian fleet, A. U. C. 304. He died as he was beſieging the town of Citium in Cyprus. He may be called the laſt of the Greeks whoſe ſpirit and boldneſs defeated the armies of the barbarians. He was ſuch an inveterate enemy to the Perſian power, that he formed a plan of totally deſtroying it; and in his wars he had ſo reduced the Perſians, that they promiſed in a treaty, not to paſs the Chelidonian iſlands with their fleet, or to approach within a day's journey of the Grecian ſeas. See Attica, § 11 & 12.

* CIN. See Cen.

(1.) CINALOA, or Cinoloa, a province of Mexico, in South America, abounding in corn, cattle, and cotton; and rendered extremely pictureſque, by a number of beautiful caſcades of clear water that fall down from the mountains. It lies on the eaſtern coaſt of the ſea of California.

(2.) Cinaloa, the capital of the above province, (N° 1.) ſeated 30 miles E. of the bay of California. Lon. 113. 12. W. Lat. 25. 40. N.

CINAN, a large and populous town of China, ſeated in a marſhy ground. Lon. 103. 35. E. Lat. 30. 7. N.

CINARA, in botany. See Cynara.

CINCA, or Cinga, a rapid river of Spain, in Arragon, which riſes in Mount Bielſa, among the Pyrenees, whence it runs through the province and falls into the Ebro.

CINCHONA, in botany, a genus of the monogynia order, belonging to the pentandria claſs of plants; and, in the natural method, ranking with thoſe plants, the order of which is *Dubious*. The corolla is funnel ſhaped, with a woolly ſummit; the capſule inferior, bilocular, with a parallel partition. Linnæus deſcribes two ſpecies: See N° 1, and 3: but a third ſpecies not deſcribed by Linnæus has ſince been diſcovered. See N° 2.

1. Cinchona corymbifera, corymb-bearing cinchona, or white Peruvian bark, with oblong lanceolate leaves and axillary corymbs. This ſpecies particularly abounds in the hilly parts of Quito, growing promiſcuouſly in the foreſts, and is ſpontaneouſly propagated from its ſeeds. See N° 3.

2. Cinchona Jamaicensis is a native of the Weſt India iſlands, particularly of Jamaica: It is accurately deſcribed by Dr Wright, under this title, in a paper publiſhed in the *Philoſ. Tranſ.* In Jamaica it is called the *ſea-ſide beech*, and grows from 20 to 40 feet high. The white, furrowed, thick outer bark is not uſed; the dark brown inner bark has the common flavour, with a mixed taſte, at firſt of horſe radiſh and ginger, becoming at laſt bitter and aſtringent. It ſeems to give out more extractive matter than the cinchona officinalis. Some of it was imported from St Lucia, in conſequence of its having been uſed with advantage in the army and navy during the laſt war; and it has lately been treated of at conſiderable length by Dr Kentiſh, under the title of St Lucia's Bark. When freſh it is a conſiderable emetic and cathartic, properties which it is ſaid to loſe by drying.

3. Cinchona officinalis, or coloured Peruvian bark, with elliptic leaves, downy underneath, and the leaves of the corolla woolly. Both the corymbifera and officinalis are natives of Peru, where they attain the height of from 15 to 20 feet. They are both found in the province of Santa Fe. The bark has an odour, to ſome people not unpleaſant, and very perceptible in the diſtilled water, in which floating globules, like eſſential oil, have been obſerved. Its taſte is bitter and aſtringent, accompanied with a degree of pungency, and leaving a conſiderably laſting impreſſion on the tongue. According to ſome, the Peruvians learned the uſe of the bark by obſerving certain animals affected with intermittents inſtinctively led to it; while others ſay, that a Peruvian having an ague, was cured by happening to drink of a pool, which, from ſome trees having fallen into it, taſted of cinchona; and its uſe in gangrene is ſaid to have originated from its curing one in an aguiſh patient. About 1640, the lady of the Spaniſh viceroy, the Comitiſſa del Cinchon, was cured by the bark, which has there been called *Cortex* or *Pulvis Comitiſſæ, Cinchona, Chinachina*, or *Chinchina, Kinakina* or *Kinkina, Quinaquina* or *Quinquina*; and from the intereſt which the Cardinal de Lugo and the Jeſuit fathers took in its diſtribution, it has been called *Cortex* or *Pulvis Cardinalis de Lugo, Jeſuiticus, Patrum, &c.* For its properties and preparations. See Peruvian Bark.

(1.) CINCINNATI, a flouriſhing poſt town of the United States, in the North-weſtern Territory, and the preſent ſeat, ſays Mr Scott, in his *United States Gazetteer for 1795*, of the American government. It is ſeated on the N. ſide of the Ohio, oppoſite to the mouth of Licking river, and contained, at that period about 200 houſes. It has a fort, named Fort Washington, which is the grand magazine of ſtores for the weſtern army, and is large enough to contain 300 men. Cincinnati is 70 miles N. of George-town, 82 N. by E. of Frankfort, and 759 W. by S. of Philadelphia: from which it lies in Lon. 9. 44. W. Lat. 39. 7 N.

(2.) Cincinnati, a ſociety which was eſtabliſhed in America ſoon after the peace, and conſiſts of the generals and officers of the army and navy of the United States. This inſtitution ſo named from the celebrated Roman patriot, (See Cincinnatus, N° 1.) was intended to perpetuate the memory of the revolution, the friendſhip of the officers, and the union of the States; and alſo to raiſe a fund for the relief of poor widows and orphans, whoſe huſbands and fathers had fallen during the war, and for their deſcendents. This ſociety was ſub-divided into ſtate ſocieties, which were to meet on the 4th of July, and with other buſineſs depute a number of their members to convene annually in general meetings. The members were to be diſtinguiſhed by wearing a medal, emblematical of the deſign of the ſociety: and the honours and advantages were to be hereditary in the eldeſt male heirs, and, in default of male iſſue, in the collateral male heirs. Honorary members were to be admitted, but without the hereditary advantage of the ſociety, and provided their number ſhould never exceed the ratio of one to four of the officers or their deſcendents. Tho' the apparent deſigns of this ſociety were harmleſs and honourable, it did not eſcape popular jealouſy. Views of a deeper nature were imputed to the framers; and the inſtitution was cenſured and oppoſed, as giving birth to a military nobility, or a dangerous ariſtocratic power, which might ultimately prove ruinous to the liberties of the new republic. But the principal ground of apprehenſion was the ſuppoſed right of inheritance connected with this honour to render it hereditary; which, however, hath been given up and totally diſclaimed by the ſociety.

(1.) CINCINNATUS, Titus Quinctius, a Roman hero, whoſe diſintereſted patriotiſm, reflects eternal honour on his memory, as well as on his country, which he was thrice the means of ſaving. On the firſt of theſe occaſions, the diſputes between the ſenate and the people of Rome had run to ſuch a height about the Agrarian law, that they were on the point of coming to an open rupture, when Cincinnatus, being elected dictator, and taken from his plough, by his wiſe counſels and prudent management, healed their differences and prevented that worſt of calamities, a civil war. Some time after this, when the conſul Minucius, with the whole Roman army, were ſurrounded and in danger of being cut off by the combined armies of the Æqui and Volſci, he was called forth a 2d time to be dictator, he conquered the enemies of Rome, and, refuſing all rewards, retired again to his farm, after he had been dictator only 16 days. The ſame circumſtance occurred once more in the 80th year of his age. He died A. A. C. 376. See Rome, history of.

(2.) Cincinnatus, a military townſhip of New York, E. of Virgil, and W. of Salem, ſituated on two branches of the Jiochedga. Lat. 42. 30. N.

* CINCTURE. *n. ſ.* [*cinctura*, Lat.] 1. Something worn round the body.—

No happy he, whoſe cloak and *cincture*
Hold out this tempeſt. *Shakſpeare.*

2. An incloſure.—The court and priſon being within the *cincture* of one wall. *Bacon's Hen.* VII 3. [In architecture.] A ring or liſt at the top and bottom of the ſhaft of a column; ſeparating the ſhaft at one end from the baſe, at the other from the capital. It is ſuppoſed to be in imitation of the girths or ferrils anciently uſed, to ſtrengthen and preſerve the primitive wood columns. *Chamb.*

* CINDER. *n. ſ.* [*cendre*, Fr. from *cineris*, Lat.] 1. A maſs ignited and quenched, without being reduced to aſhes.—

I ſhould make very forges of my cheeks,
That would to *cinders* burn up modeſty,
Did but I ſpeak thy deeds! *Shakeſpeare.*

—There is in ſmiths *cinders*, by ſome adheſion of iron, ſometimes to be found a magnetical operation. *Brown.* 2. A hot coal that has ceaſed to flame.—

If from a down the hopeful chops
The fat upon a *cinder* drops,
To ſtinking ſmoke it turns the flame. *Swift.*

* Cinder-wench. } *n. ſ.* [*cinder* and *woman.*]
* Cinder-woman. } A woman whoſe trade is to rake in heaps of aſhes for cinders.—

'Tis under ſo much naſty rubbiſh laid,
To find it out's the *cinder-woman's* trade.
Eſſay on Satire.

—She had above five hundred ſuits of fine cloaths, and yet went abroad like a *cinder-wench.* *Arbuth.*

CINEAS, a Theſſalian, miniſter and friend to Pyrrhus king of Epirus. He was ſent to Rome by his maſter to ſue for a peace, which he, however, could not obtain. He told Pyrrhus that the Roman ſenate was a venerable aſſembly of kings; and obſerved, that to fight with them was to fight againſt another Hydra. He had ſuch a retentive memory, that the day after his arrival at Rome he could call every ſenator and knight by his name.

* CINERATION. *n. ſ.* [from *cineres*, Lat.] The reduction of any thing by fire to aſhes. A term of chymiſtry.

CINEREOUS, *adj.* aſh-coloured; having the appearance of aſhes; ſprinkled as with aſhes. *Aſh.*

* CINERITIOUS. *adj.* [*cinericius*, Lat.] Having the form or ſtate of aſhes.—The nerves ariſe from the glands of the *cineritious* part of the brain, and are terminated in all parts of the body. *Cheyne.*

* CINERULENT. *adj.* [from *cineres*, Lat.] Full of aſhes. *Dict.*

CINESI, a town of Sicily, in the valley of Mabara. Excellent manna is collected in its neighbourhood. It is 20 miles W. of Palermo.

CINGETORIX, a Britiſh prince in Kent, who oppoſed Cæſar.

* CINGLE. *n. ſ.* [*cingulum*, Lat.] A girth for a horſe. *Dict.*

(1.) CINNA, Caius Helvius, a poet intimate with Cæſar. He went to attend the obſequies of Cæſar, and being miſtaken by the populace for another Cinna, he was torn to pieces.

(2.) Cinna, Cornelius, a grandſon of Pompey. He conſpired againſt Auguſtus, who pardoned him, and made him one of his moſt intimate friends. He was conſul A. U. C. 758, and made Auguſtus his heir.

(3.) CINNA, Lucius Cornelius, a Roman who oppreſſed the republic with his cruelties. He was baniſhed by Octavius for attempting to make the fugitive ſlaves free. He joined with Marius; and with him at the head of the ſlaves he defeated his enemies, and got himſelf made conſul a fourth time. He maſſacred ſo many citizens at Rome, that his name became odious; and one of his officers aſſaſſinated him at Ancona, as he was preparing war againſt Sylla.

(1.) * CINNABAR. *n. ſ.* [*cinnabar'is*, Latin.] Cinnabar is native or factitious: the factitious cinnabar is called vermilion.—*Cinnabar* is the ore out of which quickſilver is drawn, and conſiſts partly of a mercurial, and partly of a ſulphureo-ochreous matter. *Woodward.*—The particles of mercury uniting with the particles of ſulphur, compoſe *cinnabar*. *Newton.*

(2.) CINNABAR, FACTITIOUS, is a mixture of mercury and ſulphur ſublimed, and thus reduced into a fine red glebe. The beſt is of a high colour, and full of fibres like needles. See CHEMISTRY, *Index*.

(3.) CINNABAR, NATIVE, is an ore of quickſilver, moderately compact, very heavy, and of an elegant ſtriated red colour.

(4.) * CINNABAR OF ANTIMONY, is made of mercury, ſulphur, and crude antimony.

(5.) CINNABAR USES OF. The chief uſe of cinnabar is for painting. Although the body is compoſed of ſulphur, which is of a light yellow colour, and mercury which is white as ſilver, it is nevertheleſs of an exceeding ſtrong red colour. Lumps of it are of a deep brown red without brilliancy; but when the too great intenſity of its colour is diminiſhed by bruiſing and dividing it into ſmall parts, the red of the cinnabar, becomes more and more exalted, flame coloured, and exceedingly vivid and brilliant: in this ſtate it is called VERMILION. Cinnabar is often employed as an internal medicine. Hoffman greatly recommends it as a ſedative and antiſpaſmodic: and Stahl makes it an ingredient in his *temperant powder*. Other intelligent phyſicians deny that cinnabar taken internally has any medical quality. Their opinion is grounded on the inſolubility of this ſubſtance in any menſtruum. This queſtion concerning its internal utility cannot be decided without further experiments; but cinnabar is certainly uſed with ſucceſs to procure a mercurial fumigation, when that method of cure is proper in venereal diſeaſes. For this purpoſe it is burnt in an open fire on red-hot coals, by which the mercury is diſengaged and forms vapours, which being applied to the body of the diſeaſed perſon, penetrate through the pores of the ſkin, and produce effects ſimilar to thoſe of mercury adminiſtered by friction.

(1.) * CINNAMON. *n. ſ.* [*cinnamomum*, Lat.] The fragrant bark of a low tree in the iſland of Ceylon. Its leaves reſemble thoſe of the olive, both as to ſubſtance and colour. The fruit reſembles an acorn or olive, and has neither the ſmell nor taſte of the bark. When boiled in water, it yields an oil, which, as it cools and hardens, becomes as firm and white as tallow; the ſmell of which is agreeable in candles. The cinnamon of the ancients was different from ours. *Chambers.*—

Let Araby extol her happy coaſt,
Her *cinnamon* and ſweet amomum boaſt. *Dryd.*

(2.) CINNAMON is the bark of two ſpecies of laurus. The true cinnamon is from the laurus cinnamomum; and the baſe cinnamon, which is often ſold for the true, is from the laurus caſſia. See LAURUS.

(3.) CINNAMON, CLOVE, is the bark of a tree growing in Brazil, which is often ſubſtituted for real cloves.

(4.) * CINNAMON WATER is made by diſtilling the bark, firſt infuſed in barley water, in ſpirit of wine or white wine. *Chambers.*

(5.) CINNAMON, WHITE, or *Winter's bark*, is the bark of a tree frequent in the iſle of St Domingo, Guadaloupe, &c. of a ſharp biting taſte like pepper. Some uſe it inſtead of nutmeg; and in medicine it is eſteemed a ſtomachic and antiſcorbutic. See CANELLA.

CINNAMUS, a Greek hiſtorian, who wrote a hiſtory of the eaſtern empire, during the reigns of John and Manuel Comnenus, from A. D. 1118 to 1143. His ſtyle is reckoned the beſt of the modern Greek authors. He died after 1183.

CINNERETH. See GENNESARETH.

CINOLOA. See CINALOA, N° 1. and 2.

* CINQUE. *n. ſ.* [Fr.] A five. It is uſed in games alone; but is often compounded with other words.

(1.) * CINQUE-FOIL. *n. ſ.* [*cinque feuille*, Fr.] A kind of five-leaved clover.

(2.) CINQUE-FOIL. See POTENTILLA.

CINQUEL, a town and river in Sumatra.

CINQUE-MARS, a town of France, in the department of Indre and Loire, 10 m. NW. of Tours.

* CINQUE-PACE. *n. ſ.* [*cinque pas*, Fr.] A kind of grave dance.—Wooing, wedding, and repenting is a Scotch jig, a meaſure, and a *cinque-pace*. The firſt ſuit is hot and haſty, like a Scotch jig, and full as fantaſtical; the wedding, mannerly and modeſt, as a meaſure, full of ſtate and gravity; and then comes repentance, and, with his bad legs, falls into the *cinque-pace* faſter and faſter, 'till he ſinks into his grave. *Shakeſpeare.*

(1.) * CINQUE-PORTS. *n. ſ.* [*cinque ports*, Fr.] Thoſe havens that lie towards France, and therefore have been thought by our kings to be ſuch as ought moſt vigilantly to be obſerved againſt invaſion. In which reſpect, the places where they have a ſpecial governour or keeper, called by his office Lord Warden of the *cinque-ports*; and divers privileges granted to them, as a particular juriſdiction, their warden having the authority of an admiral among them, and ſending out writs in his own name. The *cinque-ports* are Dover, Sandwich, Rye, Haſtings, Winchelſea, Rumney, and Hithe; ſome of which, as the number exceeds five, muſt either be added to the firſt inſtitution by ſome later grant, or accounted as appendants to ſome of the reſt. *Cowel.*—

They, that bear
The cloth of ſtate above her, are four barons
Of the *cinque-ports*. *Shakeſpeare.*

(2.) CINQUE PORTS were thus called by way of eminence on account of their ſuperior importance, as having been thought to merit a particular regard by the kings of England, for their preſervation againſt invaſion. Hence they have a particular policy, and are governed by a keeper with the title of *Lord Warden of the Cinque Ports*. Camden tells us, that William the Conqueror firſt appointed a warden of the Cinque ports: but king John firſt granted them their privileges, upon condition they ſhould provide 80 ſhips at their own charges for 40 days, as often as the king ſhould have occaſion in the wars; he being then ſtraitened for a navy to recover Normandy. The five ports are, Haſtings, Romney, Hythe, Dover, and Sandwich. Thorn tells us, that Haſtings provided 21 veſſels, and in each veſſel 21 men. To this port belong Seaford, Pevenſey, Hedney, Winchelſey, Rye, Hamine, Wakeſbourn, Creneth, and Forthclipe. Romney provided 5 ſhips, and in each 24 men. To this belong Bromhal, Lyde, Olwarſtone, Dangemares, and Romenhal. Hythe furniſhed 5 ſhips, and in each 21 ſeamen. To this belongs Weſtmeath. Dover the ſame number as Haſtings. To this belong Folkſton, Feverſham, and Marge. Sandwich furniſhed the ſame number with Hythe. To this belong Fordiwic, Reculver, Serre, and Deal. The privileges granted to them in conſequence of theſe ſervices were very great. Amongſt others, they were each of them to ſend two barons to repreſent them in parliament; their deputies were to bear the canopy over the king's head at the time of his coronation, and to dine at the uppermoſt table in the great hall on his right hand; to be exempted from ſubſidies and other aids; their heirs to be free from perſonal wardſhip, notwithſtanding any tenure; to be impleaded in their own towns only, and not to be liable to tolls, &c.

CINQUE-VILLAS, a town of Portugal, in the province of Beira, 2 leagues NE. of Almeida.

CINQUEL, a town of the iſland of Sumatra, on the weſtern bank of a river of the ſame name.

CINTEGABELLE, a town of France, in the department of the Upper Garonne, and chief place of a canton, in the diſtrict of Muret, ſituated on the Arriege, 16 miles S. of Toulouſe.

CINTRA, a town of Portugal, in Eſtremadura, ſituated between the mountains of Cintra, anciently called the *Mountains of the Moon*, at the foot of a promontory on the N. ſide of the entrance of the Tajo, commonly called the *Rock of Liſbon*. Here was a palace built by the Moors, which was deſtroyed by an earthquake in 1655, and rebuilt by king Joſeph in the ſame ſtile. Cintra contains four pariſh churches, and 1900 inhabitants. It is 13 miles NW. of Liſbon. Lon. 10. 15. W. Lat. 59. 0. N.

CINUS, or CYNUS, a famous civilian of Piſtoia in the 14th century. His commentary on the Code was finiſhed in 1315: he alſo wrote on ſome parts of the digeſt. He was no leſs famous for his Italian poems; and is ranked among thoſe who firſt gave graces to the Tuſcan lyric poetry.

CINYRA, in the Jewiſh antiquities, a muſical inſtrument. This, and the Hebrew CHINNOR, which is generally tranſlated *citheria*, *lyra*, or *pſalterium*, are the ſame. It was made of wood, and was played on in the temple of Jeruſalem. Joſephus ſays that the cinyra of the temple hath ten ſtrings and that it was touched with a bow. In another place he ſays that Solomon made a great number of them with a precious kind of metal called *electrum*; wherein he contradicts the ſcriptures, which inform us that Solomon's *chinnors* were made of wood.

CINYRAS, in fabulous hiſtory, a king of Cyprus, ſon of Paphus. He married Cenchreis, by whom he had a daughter called MYRRHA. Myrrha fell in love with her father, and in the abſence of her mother ſhe introduced herſelf into his bed by means of her nurſe. Cinyras had by her a ſon called ADONIS; and when he knew the inceſt he had committed, he attempted to ſtab his daughter, who eſcaped his purſuit and fled into Arabia, where, after ſhe had brought forth, ſhe was changed into a tree which ſtill bears her name. Cinyras, according to ſome, ſtabbed himſelf.

CINZANO, a town of Italy, in the principality of Piedmont, 5 miles SSE. of Chivazzo.

CIOGA. See BORAX, § II.

(1.)* CION. *n. ſ.* [*ſion*, or *ſcion*, Fr.] 1. A ſprout; a ſhoot from a plant.—We have reaſon to cool our raging motions, our carnal ſtings, our unbitted luſts; whereof I take this that you call love, to be a ſect or *cion*. *Shakeſpeare*.—The ſtately Caledonian oak, newly ſettled in his triumphant throne, begirt with *cions* of his own royal ſtem. *Howel*. 2. The ſhoot engrafted or inſerted on a ſtock.—The *cion* over-ruleth the ſtock; and the ſtock is but paſſive, and giveth aliment, but no motion to the graft. *Bacon*.

(2.) CIONS, or CYONS, in gardening, are uſed in grafting; which is performed by the application of the cion of one plant upon the ſtock of another. To produce a ſtock of cions for grafting, planting, &c. the gardeners ſometimes cut off the bodies of trees a little above the ground, and only leave a ſtump or root ſtanding: the redundant ſap will not fail next ſpring to put forth a great number of ſhoots. In dreſſing dwarf trees, a great many cions are to be cut off.

CIOTAT, a ſea port town of France, in the department of the Mouths of the Rhone, and ci-devant province of Provence; famous for Muſcadine wine. It is ſeated on the bay of Laquea, between Marſeilles and Toulon; and the harbour is defended by a ſtrong fort. Lon. 5. 46. E. Lat. 43. 12. N.

(1.)* CIPHER. *n. ſ.* [*chifre*, Fr. *zifra*, Ital *cifra*, low Lat. from an oriental root.] 1. An arithmetical character, by which ſome number is noted; a figure. 2. An arithmetical mark, which, ſtanding for nothing itſelf, increaſes the value of the other figures.—If the people be ſomewhat in the election, you cannot make them nulls or *ciphers* in the privation or tranſlation. *Bacon*.—As in accounts, *ciphers* and figures paſs for real ſums, ſo names paſs for things. *South*. 3. An intertexture of letters engraved uſually on boxes or plate.—

Troy flam'd in burniſh'd gold; and o'er the throne,
Arms and the man in golden *ciphers* ſhone. *Pope*.
Some mingling ſtir the melted tar, and ſome
Deep on the new-ſhorn vagrant's heaving ſide,
To ſtamp the maſter's *cipher*, ready ſtand. *Thomſ.*

4. A character in general.—In ſucceeding times this wiſdom began to be written in *ciphers* and characters, and letters bearing the form of cr

[illegible]

tures. *Raleigh*. 5. A ſecret or occult manner of writing, or the key to it.—He was pleaſed to command me to ſtay at London, to ſend and receive all his letters; and I was furniſhed with mine ſeveral *ciphers*, in order to it. *Denham*.

(2.) CIPHER, or CYPHER, § 1. *def.* 2. See ARITHMETIC, *Index*.

(3.) CIPHER (§ 1. *def.* 3.) is a kind of enigmatic character, compoſed of ſeveral letters interwoven, which are generally the initial letters of the perſons names for whom the ciphers are intended. Theſe are frequently uſed on ſeals, coaches, and other moveables. Anciently, merchants and tradeſmen were not allowed to bear arms: in lieu thereof, they bore their ciphers, or the initial letters of their names, artfully interwoven about a croſs; of which we have divers inſtances on tombs, &c. See DEVICE.

(4.) CIPHER, as defined, § 1. *def.* 5. means certain ſecret characters diſguiſed and varied, uſed in writing letters that contain ſome ſecret, not to be underſtood but by thoſe between whom the cipher is agreed on. De la Guilletiere, in his *Lacedæmon ancient and modern*, endeavours to make the ancient Spartans the inventors of the art of writing in cipher. Their ſcytala, according to him, was the firſt ſketch of this myſterious art; theſe ſcytalæ were two rollers of wood, of equal length and thickneſs; one of them kept by the ephori; the other by the general of the army ſent on any expedition againſt the enemy. When thoſe magiſtrates would ſend any ſecret orders to the general, they took a ſlip of parchment, and rolled it very exactly about the ſcytala which they had reſerved; and in this ſtate wrote their intentions, which appeared perfect and conſiſtent while the parchment continued on the roll: when taken off, the writing was maimed, and without connection: but was eaſily retrieved by the general, upon his applying it to his ſcytala. Polybius ſays, that Æneas Tacticus, 2000 years ago, collected together 20 different manners of writing ſo as not to be underſtood by any but thoſe in the ſecret; part whereof were invented by himſelf, and part uſed before his time. Trithemius, Cap. Porta, Vigenere, and P. Niceron, have written expreſsly on the ſubject of ciphers. Among the various methods that have been invented for communicating intelligence by ciphers, we ſelect the following by way of ſpecimen. See § 5—8.

(5.) CIPHER BY CARDS. The parties muſt previouſly agree in what manner the pack of cards ſhall be firſt placed, and then how they ſhall be ſhuffled. Thus ſuppoſe the cards are to be firſt placed in the order as hereafter follows, and then ſhuffled by taking off 3 from the top, putting the next 2 over them, and the following 3 under them, and ſo alternately. By ſhuffling the cards in this manner, there will remain only 2 to put under at laſt. Therefore the party who ſends the cipher firſt writes the contents of it on a ſeparate paper, and then copies the firſt 32 letters on the cards by writing one letter on every card; he then ſhuffles them in the manner deſcribed, and writes the ſecond 32 letters: he ſhuffles them a ſecond time, and writes the third 32 letters, and ſo of the reſt. An example will make this plain. Suppoſe the letter to be as follows: "I am in full march to relieve you; within| three days I ſhall be with you. If the ene|my in the mean time ſhould make an aſſau|lt, remember what you owe to your countr|y, to your family, and yourſelf. Live with ho|nour, or die with glory."

Order of the cards before
the 1ſt ſhuffle.

Ace ſpades	*i*	*a*	*d*	*u*	*y*	*i*
Ten diamonds	*a*	*l*	*e*	*u*	*l*	
Eight hearts	*m*	*l*	*m*	*o*	*i*	*u*
King ſpades	*i*	*s*	*u*	*m*	*l*	
Nine clubs	*n*	*h*	*l*	*e*	*o*	
Seven diamonds	*f*	*b*	*m*	*r*	*i*	
Nine diamonds	*u*	*e*	*a*	*c*	*i*	*n*
Ace clubs	*l*	*w*	*k*	*r*	*y*	*i*
Knave hearts	*l*	*s*	*e*	*e*	*a*	*e*
Seven ſpades	*m*	*i*	*a*	*r*	*m*	*w*
Ten clubs	*a*	*i*	*t*	*h*	*e*	*r*
Ten hearts	*r*	*r*	*h*	*o*	*f*	
Queen ſpades	*c*	*h*	*e*	*e*	*i*	
Eight diamonds	*h*	*a*	*h*	*y*	*w*	
Eight clubs	*t*	*y*	*o*	*o*	*o*	*l*
Seven hearts	*o*	*y*	*a*	*o*	*h*	*o*
Queen clubs	*r*	*o*	*n*	*u*	*y*	*h*
Nine ſpades	*e*	*u*	*i*	*y*	*f*	*y*
King hearts	*l*	*e*	*t*	*e*	*u*	*o*
Queen diamonds	*i*	*d*	*s*	*o*	*e*	
Eight ſpades	*e*	*i*	*n*	*w*	*s*	*o*
Knave clubs	*v*	*f*	*a*	*n*	*t*	*g*
Seven clubs	*e*	*t*	*s*	*l*	*y*	
Ace hearts	*y*	*r*	*e*	*b*	*r*	
Nine hearts	*o*	*l*	*n*	*w*	*o*	*t*
Ace diamonds	*u*	*h*	*s*	*t*	*&*	*d*
Knave ſpades	*w*	*l*	*m*	*a*	*l*	
Ten ſpades	*i*	*e*	*y*	*t*	*r*	*r*
King diamonds	*t*	*t*	*i*	*b*	*u*	*r*
Queen hearts	*h*	*h*	*m*	*m*	*u*	
King clubs	*i*	*n*	*a*	*t*	*h*	
Knave diamonds	*n*	*e*	*u*	*r*	*o*	

The perſon that receives theſe cards firſt places them in the order agreed on, and tranſcribes the firſt letter on every card. He then ſhuffles them, according to order, and tranſcribes the ſecond letter on each card. He ſhuffles them a ſecond time, and tranſcribes the third letters: and ſo of the reſt. If the cards were to be ſhuffled the ſecond time by threes and fours, the third time by twos and fours, &c. it would make the cipher ſtill depend on the combination of letters, there are ſcarce any that may not be deciphered with time and pains; and we may add *patience*. Thoſe ciphers are the beſt that are by their nature moſt free from ſuſpicion of being ciphers; as for example, if the letters were there wrote with ſympathetic ink, the cards might then paſs for a common pack.

(6.) CIPHER BY CORRESPONDING SPACES. Take two pieces of paſteboard or ſtiff paper, through which you muſt cut long ſquares, at different diſtances, as you will ſee in the following example. One of theſe pieces you keep yourſelf, and the other you give to your correſpondent. When you would ſend him any ſecret intelligence, you lay the paſteboard upon a paper of the ſame ſize; and in the ſpaces cut out, you write what you would have underſtood by him only, and then fill up the intermediate ſpaces with ſomewhat that makes with thoſe words a different ſenſe.

"|I ſhall be| much obliged to you, as reading |alone| engages my attention |at| preſent, if you will lend me any one of the |eight| volumes of the Spectator. I hope you will excuſe |this| freedom, but for a winter's |evening| I |don't| know a better entertainment. If I |fail| to return it ſoon, never truſt me for the time |to come|." A paper of this ſort may be placed four different ways, either by putting the bottom at the top, or by turning it over; and by theſe means the ſuperfluous words may be the more eaſily adapted to the ſenſe of the others. This is a very eligible cipher, as it is free from ſuſpicion, but it will do only for ſhort meſſages: but if the ſpaces be frequent, it will be very difficult to make the concealed and obvious meanings agree together: and if the ſenſe be not clear, the writing will be liable to ſuſpicion.

(7.) Cipher by dials. On a piece of ſquare paſteboard ABCD, *Plate* 76. *fig.* 1, 2. draw the circle EFGH, and divide it into 26 equal parts, in each of which muſt be wrote one of the letters of the alphabet. On the inſide of this there muſt be another circle of paſteboard, ILMN, moveable round the centre O, and the extremity of this muſt be divided into the ſame number of equal parts as the other. On this alſo muſt be wrote the letters of the alphabet, which, however, need not be diſpoſed in the ſame order. The perſon with whom you correſpond muſt have a ſimilar dial, and at the beginning of your letter you muſt put any two letters that anſwer to each other when you have fixed the dial. *Example.* Suppoſe you would write as follows: "If you will come over to us, you ſhall have a penſion, and you may ſtill make a ſham oppoſition." You begin with the letters *Ma*, which ſhow how the dial is fixed: then for *If you*, you write *un juc*, and ſo for the reſt, as at *fig.* 3. The ſame intention may be anſwered by a ruler, the upper part of which is fixed and the lower part to ſlide; but in this caſe the upper part muſt contain two alphabets in ſucceſſion, that ſome letter of that part may conſtantly correſpond to one in the lower part. The diviſions ſtanding directly over each other in a ſtraight line will be much more obvious than in the circumference of a circle. Or two ſtraight pieces of paſteboard regularly divided, the one containing a ſingle and the other a double alphabet, would anſwer exactly the ſame purpoſe. In this caſe a blank ſpace may be left at each end of the ſingle alphabet, and one or two weights being placed on both the pieces will keep them ſteady.

(8.) Cipher, musical. The conſtruction of this cipher is ſimilar to that in § 7. The circle EFGH *fig.* 1. is to be divided into equal parts; in each part there muſt be wrote one of the letters of the alphabet: and on the anterior circle ILMN, moveable round the centre O, there is to be the ſame number of diviſions: the circumference of the inner circle muſt be ruled in the manner of a muſic paper; and in each diviſion there is to be placed a note, differing either in figure or poſition. Laſtly, within the muſical lines place the three keys, and on the outer circle, the figures that are commonly uſed to denote the time. Then provide a ruled paper, and place one of the keys, as ſuppoſe that of *ge re ſol*, againſt the time two-fourths at the beginning of the paper, which will inform your correſpondent how to fix his circle. Then copy the notes that anſwer to the ſeveral letters of the words you intend to write, in the manner expreſſed at *fig.* 4. A cypher of this ſort may be made more difficult to diſcover by frequently changing the key, and that will not in the leaſt embarraſs the reader. You may likewiſe add either of the marks, (*fig.* 5.) to the note that begins a word, which will make it more eaſy to read, and at the ſame time give the muſic a more natural aſpect. This cipher is preferable to that of § 7. as it may be incloſed in a letter about common affairs, and paſs unſuſpected.

(1.) * *To* Cipher. *v. a.* To write in occult characters.—He frequented ſermons, and penned notes: his notes he *ciphered* with Greek characters. *Hayward.*

(2.) * *To* Cipher. *v. n.* [from the noun.] To practiſe arithmetic.—You have been bred to buſineſs; you can *cipher*: I wonder you never uſed your pen and ink. *Arbuthnot.*

CIPPUS, in antiquity, a low column, with an inſcription, erected on the high roads, or other places, to ſhow the way to travellers; to ſerve as a boundary; to mark the grave of a deceaſed perſon, &c.

CIRAN, St, a town of France, in the dept. of Indre, and ci-devant province of Berry.

CIRCÆA, enchanter's night-shade: A genus of the monogynia order, belonging to the diandria claſs of plants; and in the natural method ranking under the 48th order, *Aggregatæ*. The corolla is dipetalous; the calyx diphyllous, ſuperior, with one bilocular ſeed. There are two ſpecies, one of which is a native of Britain, and the other of Germany. They are low herbaceous plants with white flowers, and poſſeſſed of no remarkable property.

CIRCAR, a name given in Hindooſtan to a tract of country which, in the opinion of Major Rennel, is not very diſſimilar to the term county in England, few of them being of greater extent than the largeſt Engliſh county.

Circars, northern, five provinces on the bay of Bengal. They were originally denominated *Northern* from their poſition in reſpect to Madras, on which they depend. Of theſe Circars, Cicacole, Rajamundry, Ellore, and Condapilly are in the poſſeſſion of the Engliſh; and Guntoor belongs to the Nizam of the Deccan. The firſt four occupy the ſeacoaſt, from the Chilka Lake, on the confines of Cattack, to the N. bank of the Kiſtna; forming a ſlip of country 350 miles long, and from 25 to 75 broad. It is eaſily defenſible againſt an Indian enemy, having mountains and extenſive foreſts on one ſide, and the ſea on the other; the extremities only being open. Its greateſt defect is in point of relative ſituation to Bengal and Madras, it being 350 miles from the former, and 250 from the latter; ſo that the troops deſtined to protect it cannot be depended on, for any preſſing ſervice that may ariſe in their preſidency. The Engliſh Circars had been ceded to the French, by the Nizam of the Deccan, in 1753; but they

CIPHERS.

Fig. 1.

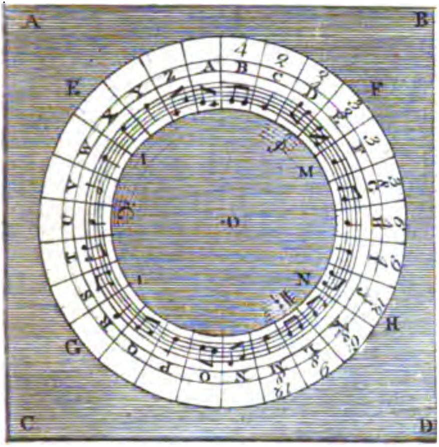


Fig. 2.

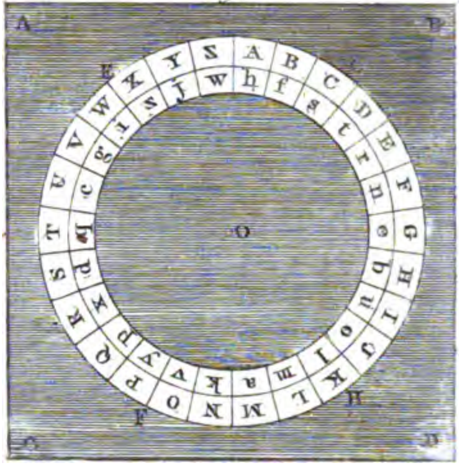


Fig. 6. Citrus
The Forbidden Fruit Tree

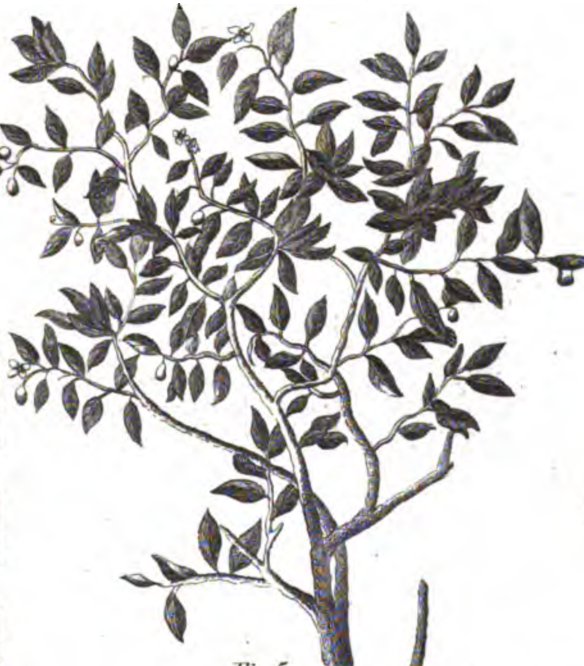


Fig. 8.
Clio

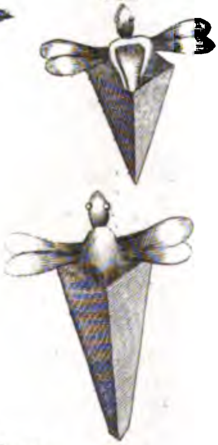


Fig. 7.
Clef

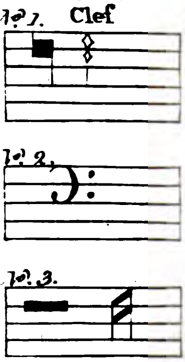


Fig. 5.

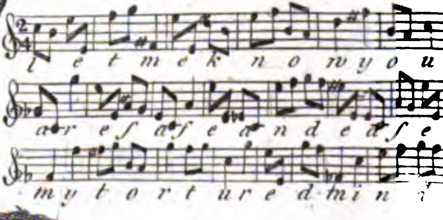
Cyphers.

Fig. 3.

Ma un jvc iumm svar
vgrx qv cd jvc dbhmm
bhgr h yrhduvh hkt
jvc ahy dqumm ahlr
h dbha vyyvduquvh

Cyphers.

Fig. 4.



were conquered by Col. Clive in 1759, and now produce an annual revenue of 360,000 l. That of Guntoor is 70,000 l.

CIRCASSIA, a large country of Aſia, ſituated between 40° and 50° Lon. E. and between 45° and 50° Lat. N. It is bounded by Ruſſia on the N. by Aſtracan and the Caſpian ſea on the E. by Georgia and Dagiſtan on the S. and by the river Don, the Palus Mœotis, and the Black Sea, on the W. This country has long been celebrated for the extraordinary beauty of its women; and here the practice of inoculating for the ſmall-pox firſt began. TERKI is the principal city. The Circaſſian prince who reſides here, is allowed 500 Ruſſians for his guard, but none of his own ſubjects are permitted to dwell within any part of the fortifications. Ever ſince the reduction of thoſe parts by the Ruſſians, they have put in all places of ſtrength, not only Ruſſian garriſons and governors, but magiſtrates, and prieſts for the exerciſe of the Chriſtian religion; yet the Circaſſian Tartars are governed by their own princes, lords, and judges: but theſe adminiſter juſtice in the name of the emperor, and in matters of importance, not without the preſence of the Ruſſian governors, being all obliged to take the oath of allegiance to his imperial majeſty. The face of this country is pleaſantly diverſified with mountains, valleys, woods, lakes, and rivers; and though not much cultivated is far from being unfruitful. There are here no public inns, which indeed are unneceſſary; for ſo great is the hoſpitality of the people, that they will contend with each other who ſhall entertain any ſtranger that happens to come among them.

CIRCASSIANS, the inhabitants of Circaſſia. The dreſs of the men is much the ſame with that of the Nagayans: only their caps are ſomething larger; and their cloaks being likewiſe of coarſe cloth or ſheep ſkins, are faſtened at the neck with a ſtring, and as they are not large enough to cover the whole body, they turn them round according to the wind and weather. The men are much better favoured than thoſe of Nagaya, and the women extremely well ſhaped, with exceeeding fine features, ſmooth clear complexions, and beautiful black eyes, which, with their black hair hanging in two treſſes, one on each ſide the face, give them a moſt lovely appearance: they wear a black coif on their heads, covered with a fine white cloth tied under the chin. During ſummer they all wear only a ſmock of divers colours, and that open ſo low before, that one may ſee below their navels: this, with their beautiful faces always uncovered, (contrary to the cuſtom of moſt of the other provinces in theſe parts,) their good humour and lively freedom in converſation, altogether render them very attracting: notwithſtanding which they have the reputation of being very chaſte, though they ſeldom want opportunity; for according to the accounts of a late traveller, it is an eſtabliſhed point of good manners among them, that as ſoon as any perſon comes in to ſpeak to the wife, the huſband goes out of the houſe: but whether this continency of theirs proceeds from their own generoſity, to recompence their huſbands for the confidence they put in them, or has its foundation only in fame, he pretends not to determine. Their language they have in common with the other neighbouring Tartars, although the chief people among them are not ignorant of the Ruſſian: their ancient and native religion is Paganiſm; for notwithſtanding they uſe circumciſion, they have neither prieſt, alcoran, nor moſque, like the Mahometans. Every perſon offers his own ſacrifice at pleaſure; for which, however, they have certain days, eſtabliſhed rather by cuſtom than any poſitive command; their moſt ſolemn ſacrifices are offered at the death of their neareſt friends; upon which occaſion both men and women meet in the field to be preſent at the offering, which is an he-goat; and having killed, they flay it, and ſtretch the ſkin with the head and horns on, upon a croſs at the top of a long pole, placed commonly in a quickſet hedge (to keep the cattle from it); and near the place the ſacrifice is offered by boiling and roaſting the fleſh, which they afterwards eat. When the feaſt is over, the men riſe, and having paid their adoration to the ſkin, and muttered over ſome prayers, the women withdraw, and the men conclude the ceremony with drinking a great quantity of aquavitæ; and this generally ends in a quarrel before they part. In ſummer the Circaſſians quit the towns, and encamp in the fields like the neighbouring Tartars; occaſionally ſhifting their ſtations along with their flocks and herds. Beſides game, in which the country greatly abounds, the Circaſſians eat beef and mutton; but that which they prefer to all others is the fleſh of a young horſe. Their bread conſiſts of thin cakes of barley meal, baked upon the hearth, which they always eat new; and their uſual drink is water or mare's milk; from the latter of which they diſtil a ſpirit, as moſt of the Tartar nations do. They allot no fixed hours for the refreſhments of the table or ſleep, which they indulge irregularly, as inclination or convenience dictates. When the men make excurſions into an enemy's country, they will paſs ſeveral days and nights ſucceſſively without ſleeping; but, at their return, devote as much time to repoſe as the ſpace in which they had before with-held from that gratification. When they eat, they ſit croſs-legged on the floor, the ſkin of ſome animal ſerving them inſtead of a carpet. In removing from one part of the country to another, the women and children are carried in waggons, which are a kind of travelling houſes, and drawn by oxen or camels, they never uſing horſes for draught. Their breed of the latter, however, is reckoned exceeding good; and they are accuſtomed to ſwim along any river on horſeback. The women and children ſmoke tobacco as well as the men; and this is the moſt acceptable commodity which a traveller can carry with him into the Tartar countries. The principal branch of their traffic is their own children, eſpecially their daughters, whom they ſell for the uſe of the ſeraglios in Turky and Perſia, where they frequently marry to great advantage, and make the fortune of their families. The merchants who come from Conſtantinople to purchaſe thoſe girls, are generally Jews, who, as well as the mothers, are ſaid to be extremely careful of preſerving the chaſtity of the young women, knowing the value that is ſet by the Turks upon the marks of virginity. The greater part of the Circaſſians are Chriſtians of the Greek church; but there are alſo both Mahometans and Pagans amongſt them.

CIRCE, in fabulous hiſtory, a daugher of Sol and Perſeis, celebrated for her knowledge of magic and venomous herbs. She was ſiſter to Æetes king of Colchis, and to Paſiphae the wife of Minos. She married a Sarmatian prince of Colchis, whom ſhe murdered to obtain the kingdom. She was expelled by her ſubjects, and carried by her father upon the coaſts of Italy in an iſland called Ææa. Ulyſſes, at his return from the Trojan war, viſited her coaſts; and all his companions, who ran headlong into pleaſure and voluptuouſneſs, were changed by Circe's potions into filthy ſwine. Ulyſſes, who was fortified againſt all enchantments by an herb called *moly*, which he had received from Mercury, went to Circe, and ſword in hand demanded the reſtoration of his companions to their former ſtate. She complied, and loaded the hero with pleaſures and honours. In this voluptuous retreat Ulyſſes had by Circe one ſon called Telegonus, or two, according to Heſiod, called Agrius and Latinus. For one whole year Ulyſſes forgot his glory in Circe's arms. At his departure the nymph adviſed him to deſcend to hell, and to conſult the manes of Tireſias concerning the fate that attended him. Circe ſhowed herſelf cruel to Scylla her rival, and to Picus.

CIRCENSIAN GAMES, a general term under which was comprehended all combats exhibited in the Roman circus, in imitation of the Olympic games in Greece. Moſt of the feaſts of the Romans were accompanied with Circenſian games; and the magiſtrates, and other officers of the republic, frequently preſented the people with them, in order to procure their favour. The grand games were held five days, commencing on the 15th Sept. See CIRCUS, § 3.

CIRCESIUM. See CARCHEMISH.

* *To* CIRCINATE. *v. a.* [*circino*, Lat.] To make a circle; to compaſs round, or turn round. *Bailey*.

* CIRCINATION. *n. ſ.* [*circinatio*, Lat.] An orbicular motion; a turning round; a meaſuring with the compaſſes. *Bailey*.

(1.) * CIRCLE. *n. ſ.* [*circulus*, Latin.] 1. A line continued 'till it ends where it begun, having all its parts equidiſtant from a common centre.—Any thing, that moves round about in a *circle*, in leſs time than our ideas are wont to ſucceed one another in our minds, is not perceived to move; but ſeems to be a perfect intire *circle* of that matter, or colour, and not a part of a *circle* in motion. *Locke*.—By a *circle* I underſtand not here a perfect geometrical *circle*, but an orbicular figure, whoſe length is equal to its breadth; and which as to ſenſe may ſeem circular. *Newt. Opt.*—

Then a deeper ſtill
In *circle* following *circle*, gathers round
To cloſe the face of things. *Thomſon's Summer*.

2. The ſpace included in a circular line. 3. A round body; an orb.—It is he that ſitteth upon the *circle* of the earth. *Iſaiah*. 4. Compaſs; incloſure.—

A great magician,
Obſcured in the *circle* of the foreſt. *Shakeſp.*

5. An aſſembly ſurrounding the principal perſon.—

To have a box where eunuchs ſing,
And, foremoſt in the *circle*, eye a king. *Pope*.

6. A company; an aſſembly.—I will call over to him the whole *circle* of beauties that are diſpoſed among the boxes. *Addiſon*.—Ever ſince that time, Liſander viſits in every *circle*. *Tatler*. 7. Any ſeries ending as it begins, and perpetually repeated.—There be fruit trees in hot countries, which have bloſſoms and young fruit, and young fruit and ripe fruit, almoſt all the year, ſucceeding one another; but this *circle* of ripening cannot be but in ſucculent plants, and hot countries. *Bacon*.—

Thus in a *circle* runs the peaſant's pain,
And the year rolls within itſelf again. *Dryden*.

8. An inconcluſive form of argument, in which the foregoing propoſition is proved by the following, and the following propoſition inferred from the foregoing.—That heavy bodies deſcend by gravity; and again, that gravity is a quality whereby an heavy body deſcends, is an impertinent *circle*, and teacheth nothing. *Glanville*.—That fallacy called a *circle*, is when one of the premiſſes in a ſyllogiſm is queſtioned and oppoſed, and we intend to prove it by the concluſion. *Watt*. 9. Circumlocution; indirect form of words.—

Has he given the lye
In *circle* or oblique, or ſemicircle,
Or direct parallel? You muſt challenge him.
Flet. Q. of Cor.

10. CIRCLES *of the German Empire*. Such provinces and principalities as have a right to be preſent at diets. They are in number ten. *Trevoux*.

(2.) CIRCLE, in geometry, a plane figure comprehended by a ſingle curve line, called its circumference, to which right lines drawn from a point in the middle, called the centre, are equal to each other. See GEOMETRY.

(3.) CIRCLE, in logic, or LOGICAL CIRCLE, is when the ſame terms are proved by the ſame terms; and the parts of the ſyllogiſm alternately by each other, both directly and indirectly. *Reaſoning in a circle*, in this manner, is very inconcluſive.

(4.) CIRCLE, FAIRY. See FAIRY CIRCLE.

(5.) CIRCLE OF PERPETUAL APPARITION, one of the leſſer circles, parallel to the equator; deſcribed by any point of the ſphere touching the northern point of the horizon; and carried about with the diurnal motion. All the ſtars included within this circle never ſet, but are ever viſible above the horizon.

(6.) CIRCLE OF PERPETUAL OCCULTATION, is another circle at a like diſtance from the equator; and contains all thoſe ſtars which never appear in our hemiſphere. The ſtars ſituated between theſe circles alternately riſe and ſet at certain times.

(7.) CIRCLES, DIURNAL, are immoveable circles, ſuppoſed to be deſcribed by the 7 ſtars, and other points of the heavens, in their diurnal rotation round the earth; or rather, in the rotation of the earth round its axis. The diurnal circles are all unequal: the equator is the biggeſt.

(8.) CIRCLE, DRUIDICAL, in Britiſh topography, a name given to certain ancient incloſures formed by rude ſtones circularly arranged, in the manner repreſented in Plate LXXV. *fig.* 8.

Theſe, it is now generally agreed, were temples, and many writers think alſo places of ſolemn aſſemblies for councils or elections, and ſeats of judgment. Mr Borlace is of this opinion. "Inſtead, therefore (ſays he,) of detaining the reader with a diſpute, whether they were places of worſhip or council, it may with great probability be aſſerted, that they were uſed for both purpoſes; and having for the moſt part been firſt dedicated to religion, naturally became afterwards the curiæ and fora of the ſame community." Theſe temples, though generally circular, occaſionally differ both in figure and magnitude: with relation to the firſt, the moſt ſimple were compoſed of one circle. Stonehenge conſiſted of two circles and two ovals, reſpectively concentric; whilſt that at Bottalch near St Juſt in Cornwall is formed by four interſecting circles. And the great temple at Aubury in Wiltſhire, it is ſaid, deſcribed the figure of a ſeraph or fiery flying ſerpent, repreſented by circles and right lines. Some beſides circles have avenues of ſtone pillars. Moſt, if not all of them, have pillars or altars within their centre. In magnitude and number of ſtones, there is the greateſt variety; ſome circles being only 12 feet diameter and formed only of 12 ſtones, whilſt others, ſuch as Stonehenge and Abury, contained, the firſt, 140, the ſecond 652, and occupied many acres of ground. All theſe different numbers and meaſures and arrangements had their pretended reference, either to the aſtronomical diviſions of the year, or ſome myſteries of the druidical religion. Mr Borlace, however, ſuppoſes, that thoſe very ſmall circles, ſometimes formed of a low bank of earth, ſometimes of ſtones erect, and frequently of looſe ſmall ſtones thrown together in a circular form, incloſing an area of about three yards diameter, without any larger circle round them, were originally places of burial.

(9.) CIRCLES, HORARY, in dialing, are the lines which ſhow the hours on dials; though theſe be not drawn circular, but nearly ſtraight. See DIALING.

(10.) CIRCLES OF ALTITUDE, or *almucantars*, are circles parallel to the horizon, having their common pole in the zenith, and ſtill diminiſhing as they approach the zenith. See ALMUCANTAR.

(11.) CIRCLES OF LATITUDE, or *Secondaries of the Ecliptic*, are great circles perpendicular to the plane of the ecliptic, paſſing through the poles thereof, and through every ſtar and planet. They are ſo called, becauſe they ſerve to meaſure the latitude of the ſtars, which is nothing but an arch of one of theſe circles interſected between the ſtar and the ecliptic. See LATITUDE.

(12.) CIRCLES OF LONGITUDE, are ſeveral leſſer circles, parallel to the ecliptic; ſtill diminiſhing, in proportion as they recede from it. On the arches of theſe circles, the longitude of the ſtars is reckoned.

(13.) CIRCLES OF THE EMPIRE. See § 1. *def.* 10. Maximilian I. divided the empire into ſix, and ſome years after into ten circles. This laſt diviſion was confirmed by Charles V. The circles, as they ſtand in the Imperial Matricola, are as follow: Auſtria, Burgundy, the Lower Rhine, Bavaria, Upper Saxony, Franconia, Swabia, Upper Rhine, Weſtphalia, and the Lower Saxony.

(14.) CIRCLES OF THE SPHERE, are ſuch as cut the mundane ſphere, and have their periphery either on its moveable ſurface, or in another immoveable, conterminous, and equidiſtant ſurface. See SPHERE. Hence ariſe two kinds of circles, moveable and immoveable. The firſt, thoſe whoſe peripheries are in the moveable ſurface, and which therefore revolve with its diurnal motion; as, the meridians, &c. The latter having their periphery in the immoveable ſurface, do not revolve; as the ecliptic, equator, and its parallels, &c. See GEOGRAPHY.

(15.) CIRCLES, POLAR, are immoveable circles, parallel to the equator, and at a diſtance from the poles equal to the greateſt declination of the ecliptic. That next the north pole is called the ARCTIC; and that next to the ſouthern one the ANTARTIC.

(1.) * *To* CIRCLE. *v. a.* [from the noun.] 1. To move round any thing.—The lords that were appointed to *circle* the hill, had ſome days before planted themſelves in places convenient. *Bacon.*—

Another Cynthia her new journey runs,
And other planets *circle* other ſuns. *Pope.*

2. To incloſe; to ſurround.—

What ſtern ungentle hands
Have lopp'd and hew'd, and made thy body bare
Of her two branches, thoſe ſweet ornaments,
Whoſe *circling* ſhadows kings have ſought to
ſleep in? *Shakeſp.*
Unſeen he glided through the joyous crowd,
With darkneſs *circled*, and an ambient cloud.
Pope.

3. *To* CIRCLE *in*. To confine; to keep together.—We term thoſe things dry which have a conſiſtence within themſelves, and which, to enjoy a determinate figure, do not require the ſtop or hindrance of another body to *circle* them *in*. *Digby.*

(2.) * *To* CIRCLE. *v. n.* To move circularly; to end where it begins.—

The well fraught bowl
Circles inceſſant; whilſt the humble cell
With quavering laugh, and rural jeſts reſounds.
Philips.
Now the *circling* years diſcloſe
The day predeſtin'd to reward his woes. *Pope.*

* CIRCLED. *adj.* [from *circle.*] Having the form of a circle; round.—

Th' inconſtant moon,
That monthly changes in her *circled* orb. *Shak.*

* CIRCLET. *n. ſ.* [from *circle.*] A circle; an orb: properly a little circle.—

Then take repaſt, 'till Heſperus diſplay'd
His golden *circlet* in the weſtern ſhade. *Pope.*

* CIRCLING. *participle adj.* [from *To circle.*] Having the form of a circle; circular; round.—

Round he ſurveys, and well might, where he
ſtood
So high above the *circling* canopy
Of night's extended ſhade. *Milton.*

CIRCONCELLIONES, a ſpecies of fanatics, ſo called becauſe they were continually rambling round the houſes in the country. They took their riſe among the Donatiſts in the reign of the emperor Conſtantine. It is incredible what ravages and cruelties theſe vagabonds committed in Africa through a long ſeries of years. They were illiterate, ſavage peaſants, who underſtood only the Punic language. Intoxicated with a barbarous zeal, they renounced agriculture, profeſſed continence, and aſſumed the title of "Vindicators of juſtice, and Protectors of the oppreſt." To accompliſh their miſſion, they enfranchiſed ſlaves, ſcoured the roads, forced maſters to alight from their chariots, and run before their ſlaves, whom they obliged to mount in their place; and diſcharged debtors, killing the creditors if they refuſed to cancel their bonds. But the chief objects of their cruelty were the catholics, and eſpecially thoſe who had renounced Donatiſm. At firſt they uſed no ſwords, becauſe God had forbidden the uſe of one to Peter; but they were armed with clubs, which they called the *clubs of Iſrael*; and which they handled in ſuch a manner as to break a man's bones without killing him immediately, ſo that he languiſhed a long time and then died. When they took away a man's life at once, they looked upon it as a favour. They became leſs ſcrupulous afterwards, and made uſe of all ſorts of arms. Their ſhout was *Praiſe be to God*. Theſe words in their mouths were the ſignal of ſlaughter, more terrible than the roaring of a lion. They had invented an unheard of puniſhment; which was to cover with lime diluted with vinegar, the eyes of thoſe unhappy wretches whom they had cruſhed with blows and covered with wounds, and to abandon them in that condition. Never was a ſtronger proof what horrors ſuperſtition can beget in minds deſtitute of knowledge and humanity. Theſe brutes, who had made a vow of chaſtity, gave themſelves up to wine and all ſorts of impurities, running about with women and young girls as drunk as themſelves, whom they called *ſacred virgins*, and who often carried proofs of their incontinence. Their chiefs took the name of *Chiefs of the Saints*. After having glutted themſelves with blood, they turned their rage upon themſelves, and ſought death with the ſame fury with which they gave it to others. Some ſcrambled up to the tops of rocks, and caſt themſelves down headlong in multitudes; others burned themſelves, or threw themſelves into the ſea. Thoſe who propoſed to acquire the title of martyrs, publiſhed it long before; upon which they were feaſted and faſtened like oxen for the ſlaughter; after theſe preparations they ſet out to be deſtroyed. Sometimes they gave money to thoſe whom they met, and threatened to murder them if they did not make them martyrs. Theodoret gives an account of a ſtout young man, who meeting with a troop of theſe fanatics, conſented to kill them, provided he might bind them firſt; and having by this means put it out of their power to defend themſelves, whipped them as long as he was able, and then left them tied in that manner. Their biſhops pretended to blame them, but in reality made uſe of them to intimidate ſuch as might be tempted to forſake their ſect; they even honoured them as ſaints. They were not, however, able to govern thoſe furious monſters; and more than once found themſelves under a neceſſity of abandoning them, and even of imploring the aſſiſtance of the ſecular power againſt them. The counts Urſacius and Taurinus were employed to quell them; they deſtroyed a great number of them, of whom the Donatiſts made as many martyrs. Urſacius, who was a good catholic and a religious man, having loſt his life in an engagement with the barbarians, the Donatiſts did not fail to triumph in his death, as an effect of the vengeance of heaven. Africa was the theatre of theſe bloody ſcenes during a great part of Conſtantine's life.

(1.) * CIRCUIT. *n. ſ.* [*circuit*, Fr. *circuitus*, Latin.] 1. The act of moving round any thing.—There are four moons alſo perpetually rolling round the planet Jupiter, and carried along with him in his periodical *circuit* round the ſun. *Watts.* 2. The ſpace incloſed in a circle.—

He led me up
A woody mountain, whoſe high top was plain
A *circuit* wide inclos'd. *Milton.*

3. Space; extent; meaſured by travelling round.—The lake of Bolſena is reckoned one and twenty miles in *circuit*. *Addiſon.* 4. A ring; a diadem; that by which any thing is encircled.—

And this fell tempeſt ſhall not ceaſe to rage,
Until the golden *circuit* on my head,
Do calm the fury of this mad-brain'd flaw.
Shakeſpeare.

1. The viſitations of the judges for holding aſſiſes.—The *circuits*, in former times, went but round about the pale; as the circuit of the cynoſura about the pole. *Davies.* 6. Long deduction of reaſon.—

Up into the watch tower get,
And ſee all things deſpoil'd of fallacies;
Thou ſhalt not peep thro' lettices of eyes,
Nor hear thro' labyrinths of ears, nor learn
By *circuit* or collections to diſcern. *Donne.*

(2.) Circuit, (§ 1. *def.* 5.) ſignifies the journey which the judges take twice every year, through the ſeveral counties of England and Wales, to hold courts and adminiſter juſtice, where recourſe cannot be had to the king's courts at Weſtminſter: hence England is divided into ſix circuits, viz. the Home circuit; the Norfolk, Midland, Oxford, Weſtern, and Northern circuits. In Wales there are but two circuits, North and South Wales: two judges are aſſigned by the king's commiſſion to every circuit. In Scotland, the judges of the ſupreme criminal court, or court of juſticiary, are divided into 3 ſeparate courts, conſiſting of two judges each; and the kingdom into as many diſtricts. In certain boroughs of every diſtrict, each of theſe courts by rotation are obliged to hold two courts in the year, in ſpring and autumn; which are called *circuit courts*.

(3.) Circuit, electrical, denotes the courſe of the electric fluid from the charged ſurface of an electric body, to the oppoſite ſurface into which the diſcharge is made. Some of the firſt electricians apprehended, that the ſame particles of electric fluid, which were thrown on one ſide of the charged glaſs, actually made the whole circuit of the intervening conductors, and arrived at the oppoſite ſide: whereas Dr Franklin's theory only requires that the redundancy of electric matter on the charged ſurface ſhould paſs into the bodies which form that part of the circuit which is contiguous to it, driving forward that part of the fluid which they naturally poſſeſs; and that the deficiency of the exhauſted ſurface ſhould be ſupplied by the neighbouring conductors, which form the laſt part of the circuit. On this ſuppoſition, a vibrating motion is ſucceſſively communicated through the whole length of the circuit. This circuit is always formed of the beſt conductors, let the length of it be ever ſo great. Many attempts were made, both in France and England, at an early period in the hiſtory of electricity, to aſcertain the diſtance to which the electric ſhock might be carried, and the velocity of its motion. The French philoſophers, at different times, made it to paſs through a circuit of 900 toiſes, and of 2000 toiſes, or about 2½ Engliſh miles; and they diſcharged the Leyden phial through a baſon of water, the ſurface of which was about an acre. And M. Mounier found, that, in paſſing through an iron wire of 950 toiſes in length, it did not ſpend a quarter of a ſecond; and that its motion was inſtantaneous through a wire of 1319 feet. In 1747, Dr Watſon, and other Engliſh philoſophers, after many experiments of a ſimilar kind, conveyed the electric matter through a circuit of 4 miles; and they concluded from this and another trial; that its velocity is inſtantaneous.

(4.) Circuit of action. [In law.] Is a longer courſe of proceeding to recover the thing ſued for than is needful. *Cowel.*

* *To* Circuit. *v. n.* [from *circuit.*] To move circularly.—

Pining with equinoctial heat, unleſs
The cordial cup perpetual motion keen,
Quick *circuiting*. *Philips.*

* **CIRCUITEER.** *n. ſ.* [from *circuit.*] One that travels a circuit.—Like your fellow *circuiteer* the ſun; you travel the round of the earth, and behold all the iniquities under the heavens. *Pope.*

* **CIRCUITION.** *n. ſ.* [*circuitio*, Lat.] 1. The act of going round any thing. 2. Compaſs; maze of argument.—To apprehend by what degrees they lean to things in ſhow, though not indeed repugnant one to another, requireth more ſharpneſs of wit, more intricate *circuitions* of diſcourſe, and depth of judgment, than common ability doth yield. *Hooker.*

(1.) * **CIRCULAR.** *adj.* [*circularis*, Lat.] 1. Round like a circle; circumſcribed by a circle.—

The frame thereof ſeem'd partly *circular*,
And part triangular. *Fairy Queen.*

—Nero's port, compoſed of huge moles running round it, in a kind of *circular* figure. *Addiſon on Italy.* 2. Succeſſive in order; always returning.—

From whence th' innumerable race of things,
By *circular* ſucceſſive order ſprings. *Roſcommon.*

3. Vulgar; mean; circumforaneous.—Had Virgil been a *circular* poet, and cloſely adhered to hiſtory, how could the Romans have had Dido! *Dennis.* 4. Ending in itſelf, uſed of a paralellogiſm, where the ſecond propoſition at once proves the firſt, and is proved by it.—One of Carte's firſt principles of reaſoning, after he had doubted of every thing, ſeems to be too *circular*, to ſafely build upon; for he is for proving the being of God from the truth of our faculties, and the truth of our faculties from the being of a God. *Baker.* 5. Circular *Letter.* A letter directed to ſeveral perſons, who have the ſame intereſt in ſome common affair; as in the convocation of aſſemblies. 6. Circular *Lines.* Such ſtrait lines as are divided from the diviſions made in the arch of a circle; as the lines of ſines, tangents, and ſecants on the plain ſcale and ſector. 7. Circular *Sailing*, is that performed on the arch of a great circle.

(2.) Circular numbers, or spherical numbers, are ſuch whoſe powers terminate in the roots themſelves. Thus, for inſtance, 5 and 6, all whoſe powers do end in 5 and 6, as the ſquare of 5 is 25; the ſquare of 6 is 36, &c.

* **CIRCULARITY.** *n. ſ.* [from *circular.*] A circular form.—The heavens have no diverſity or difference, but a ſimplicity of parts, and equiformity in motion, continually ſucceeding each other; ſo that, from what point ſoever we compute, the account will be common unto the whole *circularity*. *Brown.*

* **CIRCULARLY.** *adv.* [from *circular.*] 1. In form of a circle.—The internal form of it conſiſts of ſeveral regions, involving one another like orbs about the ſame centre, or of the ſeveral elements caſt *circularly* about each other. *Burnet.* 2. With a circular motion.—Every body moved *circularly* about any centre, recedes, or endeavours to recede, from that centre of its motion. *Ray.*

(1.) * *To* **CIRCULATE.** *v. a.* [from *circulus.*] To put about.—In the civil wars, the money ſpent on both ſides was *circulated* at home; no public debts contracted. *Swift.*

(2.) * *To* Circulate. *v. n.* 1. To move in a circle; to run round; to return to the place whence it departed in a conſtant courſe.—Nature is a perpetual motion; and the work of the univerſe *circulates* without any interval or repoſe. *L'Eſtrange.* 2. To be diſperſed.—As the mints of calumny are perpetually at work, a great number of curious inventions, iſſued out from time to time, grow current among the party, and *circulate* through the whole kingdom. *Addiſon.*

(1.) * **CIRCULATION.** *n. ſ.* [from *circulate.*] 1. Motion in a circle; a courſe in which the motion tends to the point from which it began.—What more obvious, one would think, than the *circulation* of the blood, unknown 'till the laſt age? *Burnet's Theory.*—As much blood paſſeth through the lungs as through all the reſt of the body: the *circulation* is greater, and heat greater, and their texture extremely delicate. *Abruthnot.* 2. A ſeries in which the ſame order is always obſerved, and things always return to the ſame ſtate.—As for the ſins of peace, thou haſt brought upon us the miſeries of war; ſo for the ſins of war, thou ſeeſt fit to deny us the bleſſings of peace, and to keep us in a *circulation* of miſeries. *King Charles.*—God, by the ordinary rule of nature, permits this continual *circulation* of human things. *Swift.* 3. A reciprocal interchange of meaning.—When the apoſtle ſaith of the Jews, that they crucified the Lord of glory; and when the Son of man, being on earth, affirmeth that the Son of man was in heaven at the ſame inſtant, there is in theſe two ſpeeches that mutual *circulation* before-mentioned. *Hooker.*

(2.) Circulation, in chemiſtry, is an operation whereby the ſame vapour, raiſed by fire, falls back, to be returned and diſtilled ſeveral times.

(4.) **Circulation of money.** See Commerce, and Money.

(4.) **Circulation of the blood**, the natural motion of the blood in a living animal, whereby that fluid is alternately carried from the heart into all parts of the body, by the articles, from whence it is brought back to the heart again by the veins. See Anatomy, *Index*, and Blood, § 11. In a fœtus, the apparatus for the circulation of the blood is ſomewhat different from that in adults. The ſeptum, which ſeparates the two auricles of the heart, is pierced through with an aperture, called the *foramen ovale;* and the trunk of the pulmonary artery, a little after it has left the heart, ſends out a tube into the deſcending aorta, called the *communicating canal*. The fœtus being born, the foramen ovale cloſes by degrees, and the canal of communication dries up, and becomes a ſimple ligament. Of the velocity of the circulating blood, and the time wherein the circulation is completed, ſeveral computations have been made. By Dr Keil's account, the blood is driven out of the heart into the aorta with a velocity which would carry it 25 feet in a minute: but this velocity is continually abated in the progreſs of the blood, in the numerous ſections or branches of the arteries; ſo that before it arrives at the extremities of the body, its motion is greatly diminiſhed. The ſpace of time wherein the whole maſs of blood ordinarily circulates, is variouſly determined. Some ſtate it thus: Suppoſing the heart to make two thouſand pulſes in an hour, and that at every pulſe there is expelled an ounce of blood; as the whole maſs of blood is not ordinarily computed to exceed 24 pounds, it muſt be circulated 7 or 8 times over in the ſpace of an hour. Microſcopes afford an eaſy method of ſeeing the circulation of the blood in the bodies of animals. For theſe obſervations it is neceſſary to chooſe ſuch animals as are ſmall, and eaſily manageable, and which are either wholly or in part tranſparent. The obſervations thus made are preferable to all others; for, in diſſections, the animal is in a ſtate of pain, or dying; whereas in animals ſmall enough to be thus viewed, all is left in its uſual courſe, and we ſee what nature does in her own undiſturbed method. In theſe creatures alſo, after viewing, as long as we pleaſe, the natural ſtate and current of the blood, we may, by preſſure, and ſeveral other ways, impede its courſe; and by putting various mixtures into the creatures water, induce a morbid ſtate, and finally ſee the creature die, either by means of this or by any other method; and we may thus accurately obſerve all the changes it undergoes, and ſee what occaſions the trembling pulſe, &c. of dying people. The current of the blood in ſmall animals, that is, its paſſing on through the veſſels, either to or from the heart, is very eaſily ſeen by the microſcope; but its circulation, that is, its running to the extremities of the parts, and thence returning, is more difficult; becauſe the veſſels where this ſhould be ſeen are ſo extremely minute, as not eaſily to come under obſervation. The larger arteries are eaſily diſtinguiſhed from the veins by the motion of the blood through them, which in the veins is always ſmooth and regular; but in the arteries by ſeveral propulſions after the manner of pulſation. But this difference is not to be found in the more minute veſſels; in all which, as well arteries as veins, the motion of the blood is even and regular. The tranſparent membrane, or web between the toes of a frog's hinder foot, is a very proper object to obſerve the circulation of the blood in. The tails or fins of fiſhes are alſo very fine objects; and when the fiſh is very ſmall, theſe are manageable, and afford a view of a great number of veins and arteries, with a very quick and beautiful ſucceſſion of blood through them. The tail of a flounder may be very conveniently placed before the double microſcope on a plate of glaſs; and its body being ſupported by ſomething of equal height, the fiſh will lie ſtill, and the circulation may be ſeen very agreeably. In the minuteſt veſſels thus examined, the blood always appears pale or colourleſs, but in the large ones it is manifeſtly red. The arteries uſually branch out extremely before they join the veins to carry the blood back to the heart: but this is not always the caſe; for Mr Lewenhoeck has obſerved, that on each ſide of the little griſtles which give a ſtiffneſs to the tail of a flounder, there may be ſeen a very open communication of the veins and arteries; the blood running towards the extremities through arteries, and returning back again through veins, which were evidently a continuation of thoſe arteries, and of the ſame diameter with them. The whole fiſh, on the tail of which this examination was made, was not more than half an inch in length; it is eaſy to conceive, therefore, how ſmall the tail muſt be; and yet in it there were 68 veſſels which carried and returned the blood, though theſe veſſels were far from being the moſt minute of all. How inconceivably numerous then muſt the *circulations* in the whole human body be? Mr Lewenhoeck is of opinion, that a thouſand different circulations are continually carried on in every part of a man's body in the breadth of a finger nail. The tail of a water lizard affords alſo a very entertaining proſpect of the circulation of the blood, through almoſt numberleſs ſmall veſſels; but no object ſhows it ſo agreeably, as one of theſe animals while ſo young as not to be above an inch long; for then the whole body is ſo very tranſparent, that the circulation may be ſeen in every part of it, as well as in the tail; and, in theſe objects, nothing is more beautiful than the courſe of the blood into the toes and back again, where it may be traced all the way with great eaſe. Near the head there are alſo found three ſmall fins which afford a very delightful proſpect: theſe are all divided like the leaves of polypody; and in every one of the branches of theſe, the blood may be very accurately traced, running to the end through the artery, and there returning back again by a vein of the ſame ſize, and laid in the ſame direction; and as the veſſels are very numerous and large in this part, and the 3d or 4th magnifier may be uſed, there are ſometimes ſeen 30 or 40 channels of running blood at once; and this the more as the globules of blood in the newt are large, and are fewer in number, in proportion to the quantity of ſerum, than in any other animal: and their figure, as they are protruded through the veſſels, changes in a very ſurpriſing manner. The impetus occaſioning the circulation, is great enough in ſome animals to raiſe the blood 6, 7, or 8 feet high from the blood-veſſels it ſprings out at; which, however, is far exceeding by that of the ſap of a vine in bleeding time, which will ſome times riſe 40 feet high.

(5.) CIRCULATION OF THE SAP IN PLANTS. See PLANTS, and SAP.

(6.) CIRCULATION OF THE SPIRITS, or NERVOUS FLUID. See ANATOMY, *Index*.

(7.) CIRCULATION, SUBTERRANEOUS. See SPRINGS.

(1.) * CIRCULATORY. *adj* [from *circulate*.] Circulatory Letters are the ſame with CIRCULAR *Letters*.

(2.) * CIRCULATORY. *n. ſ.* [from *circulate*.] A chymical veſſel, in which that which riſes from the veſſel on the fire, is collected and cooled in another fixed upon it, and falls down again.

CIRCULUS, in chemiſtry, an iron inſtrument in form of a ring, which being heated red-hot, and applied to the necks of retorts and other glaſs veſſels till they grow hot, a few drops of cold water thrown upon them, or a cold blaſt, will make the necks fly regularly and evenly off. Another method of doing this is, to tie a thread, firſt dipt in oil of turpentine, round the place where you would have it break; and then ſetting fire to the thread, and afterwards ſprinkling the place with cold water, the glaſs will crack exactly where the thread was tied.

CIRCUMAGENTES MUSCULI, in anatomy, certain oblique muſcles of the eyes, ſo named from their helping to turn the eyes about.

CIRCUMAGGERATION, *n. ſ.* a heaping round.

* CIRCUMAMBIENCY. *n. ſ.* [from *circumambient*.] The act of encompaſſing.—Ice receiveth its figure according unto the ſurface it concreteth, or the *circumambiency* which conformeth it. *Bacon.*

* CIRCUMAMBIENT. *adj.* [*circum* and *ambio*, Lat.] Surrounding; encompaſſing; incloſing.—The *circumambient* coldneſs towards the ſides of the veſſel like the ſecond region, cooling and condenſing of it. *Wilkins.*

* *To* CIRCUMAMBULATE. *v. n.* [from *circum* and *ambulo*, Lat.] To walk round about. *Dict.*

CIRCUMCELLIONES. See CIRCONCELLIONES.

* *To* CIRCUMCISE. *v. a.* [*circumcido*, Latin.] To cut the prepuce or foreſkin, according to the law given to the Jews.—They came to *circumciſe* the child. *Luke.*—One is alarmed at the induſtry of the whigs, in aiming to ſtrengthen their routed party by a reinforcement from the *circumciſed*. *Swift's Examiner.*

(1.) * CIRCUMCISION. *n. ſ.* [from *circumciſe*.] The rite or act of cutting off the foreſkin.—

They left a race behind
Like to themſelves, diſtinguiſhable ſcarce
From Gentiles, but by *circumciſion* vain. *Milt.*

(2.) CIRCUMCISION was firſt enjoined upon Abraham when God eſtabliſhed his covenant with him, as a ſign or ſeal of what that covenant reſpected, and how it was to be fulfilled to Abraham and the multitude of whom he was to become the father; viz. Meſſiah, the heir of all the promiſes, taking fleſh of the ſeed of Abraham, and being cut off (put to death) in the fleſh, to bring in that righteouſneſs which was to be rewarded with the bleſſing. Gen. xvii. Rom. iv. 11. It was in the year of the world 2178 that Abraham, in the faith of this, was circumciſed himſelf and all the males of his houſe; and in this view circumciſion became as it were, the initiating ordinance into the Iſraelitiſh church. During the laſt 38 years that the Iſraelites wandered in the deſert, the Hebrew children were not circumciſed; but immediately after their paſſing the Jordan, the inſtitution was revived, all the males being circumciſed; which is called a circumciſion of them the *ſecond time;* and this was a *rolling away of the reproach of Egypt:* God hereby declaring they were his free people, and heirs of the promiſed land, and removing from them what they conſidered the ſhame of the Egyptians. Joſh. v. 1—10. When circumciſion had continued a ſacred inſtitution about 1930 years, its deſign was accompliſhed in the death of the bleſſed ſeed; but like many other ordinances of the Jewiſh church which were originally intended to point forth his death and reſurrection, circumciſion had by this time, become merely a practice among the greater part of the Jews; and it is thus unmeaningly continued among the ſcattered remains of that people at this day. Circumciſion was not, however, confined to the Jews, though the high importance in which it was originally held by them ſeems beſt to account for ſuch an indelicate operation being performed among other nations, who, though in a great meaſure ignorant of what was deſigned by them, practiſed in their own way many other inſtitutions ſacred to Iſrael. Herodotus and Philo Judæus obſerve, that circumciſion obtained among the Egyptian and Ethiopians. Herodotus ſays, that the cuſtom was very ancient among each people; ſo that there was no determining which of them borrowed it from the other. The ſame hiſtorian relates, that the inhabitants of Colchis alſo uſed circumciſion; whence he concludes, that they were originally Egyptians. He adds, that the Phœnicians and Syrians were likewiſe circumciſed; but that they borrowed the practice from the Egyptians. And laſtly, that a little before the time when he wrote, circumciſion had paſſed from Colchis, to the people inhabiting near Thermodoon and Parthenius. Marſham is of opinion, that the Hebrews borrowed circumciſion from the Egyptians; and that God was not the firſt author thereof; citing Diodorus Siculus, and the fabulous Herodotus, as evidences on his ſide; which ſhows he knew not the deſign of it. The practice of circumciſion among the Hebrews differed very conſiderably from that of the Egyptians. Among the firſt it was a ceremony of religion, and was performed on the eighth day after the birth of the child. Among the latter, a point of mere decency and cleanlineſs; and, as ſome will have it, of phyſical neceſſity; and was not performed till the 13th year, and then on girls as well as boys. Among the Jews, the time for performing this rite was the 8th day. The law of Moſes ordained nothing with reſpect to the perſon by whom, the inſtrument with which, or the manner how, the ceremony was to be performed; the inſtrument was generally a knife of ſtone. The child is uſually circumciſed at home, where the father, or godfather holds him in his arms, while the operator takes hold of the prepuce with one hand, and with the other cuts it off; a third perſon holds a porringer, with ſand in it, to catch the blood; then the operator applies his mouth to the part, and having ſucked the blood, ſpits it into a bowl of wine, and throws a ſtyptic powder upon the wound. This ceremony was uſually accompanied with great rejoicings and feaſting; and it was at this time that the child was named in preſence of the company. The Jews invented ſeveral ſuperſtitious cuſtoms at this ceremony, ſuch as placing 3 ſtools, one for the circumciſor, the 2d for the perſon who holds the child, and the 3d for Elijah, who, they ſay, aſſiſts inviſibly at the ceremony, &c. The Jews diſtinguiſhed their proſelytes into two ſorts, according as they became circumciſed or not: thoſe who ſubmitted to this rite were looked upon as children of Abraham, and obliged to keep the laws of Moſes; the uncircumciſed were only bound to obſerve the precepts of Noah, and were called NOACHIDÆ. The Turks never circumciſe till the 7th or 8th year, having no notion of its being neceſſary to ſalvation. The Perſians circumciſe their boys at 13, and their girls from 9 to 15. Thoſe of Madagaſcar cut the fleſh at three ſeveral times; and the moſt zealous of the relations preſent, catches hold of the preputium and ſwallows it. Circumciſion is practiſed on women by cutting off the foreſkin of the clitoris, which bears a near reſemblance and analogy to the preputium of the male penis. We are told that the Egyptian captive women were circumciſed; and the ſubjects of Preſtor John.

(3.) CIRCUMCISION, the name of a feaſt, celebrated on the 1ſt of January, in commemoration of the circumciſion of our Saviour.

* *To* CIRCUMDUCT. *v. a.* [*circumduco*, Lat.] To contravene; to nullify: a term of civil law.—Acts of judicature may be cancelled and *circumducted* by the will and direction of the judge; as alſo by the conſent of the parties litigant, before the judge has pronounced and given ſentence. *Ayliffe's Parergon.*

(1.) * CIRCUMDUCTION. *n. ſ.* [from *circumduct.*] 1. Nullification; cancellation.—The citation may be circumducted, though the defendant ſhould not appear; and the defendant muſt be cited, as a *circumduction* requires. *Ayliffe's Parerg.* 2. A leading about.—By long *circumduction* perhaps any truth may be derived from any other truth. *Hooker.*

(2.) CIRCUMDUCTION, in Scots law. When parties in a ſuit are allowed a proof of alledgeances; after the time limited by the judge for taking that proof is elapſed, either party may apply for circumduction of the time of proving; the effect of which is, that no proof can afterwards be brought, and the cauſe muſt be determined as it ſtood when circumduction was obtained.

* CIRCUMFERENCE. *n. ſ.* [*circumferentia*, Lat.] 1. The periphery; the line including and ſurrounding any thing.—

Extend thus far thy bounds,
This be thy juſt *circumference*, O world! *Milton.*

—Fire, moved nimbly in the *circumference* of a circle, makes the whole *circumference* appear like a circle of fire. *Newton.* 2. The ſpace incloſed in a circle.—

He firſt incloſ'd for liſts a level ground,
The whole *circumference* a mile around. *Dryd.*

3. The external part of an orbicular body.—The bubble, being looked on by the light of the clouds reflected from it, ſeemed red at its apparent *circumference.* If the clouds were viewed through it, the colour at its *circumference* would be blue. *Newton's Opticks.* 4. An orb; a circle; any thing circular or orbicular.—

His pond'rous ſhield, large and round,
Behind him caſt; the broad *circumference*
Hung on his ſhoulders like the moon. *Milton.*

* *To* CIRCUMFERENCE. *v. a.* [from the noun.] To include a circular ſpace. Not proper.—Nor is the vigour of this great body included only in itſelf, or *circumference* by its ſurface; but diffuſed at indeterminate diſtances. *Brown's Vulg. Errours.*

(1.) * CIRCUMFERENTOR. *n. ſ.* [from *circumfero*, Lat. to carry about.] An inſtrument uſed in ſurveying, for meaſuring angles, conſiſting of a braſs circle, an index with ſights, and a compaſs; and mounted on a ſtaff, with a ball and ſocket. *Chambers.*

(2.) CIRCUMFERENTOR. See *Plate* LXIII. *fig.* 22. The index is commonly about 14 inches long, and an inch and a half broad; the diameter of the circle is about 7 inches. On this circle is made a chart, whoſe meridian line anſwers to the middle of the breadth of the index, and is divided into 360 degrees. There is a braſs ring ſoldered on the circumference of the circle, on which ſcrews another ring, with a flat glaſs in it, ſo as to form a kind of box for the needle, ſuſpended on the pivot in the centre of the circle. The two ſights ſcrew on, and ſlide up and down the index; the ſpangle and ſocket are ſcrewed on the back ſide of the circle for putting the head of the ſtaff in. To obſerve the quantity of an angle by the circumferentor, Let it be required to find the quantity of the angle EKG; firſt place the inſtrument at K, with the flower-de-luce of the chart towards you; then direct the ſights to E, and obſerve what degrees are cut by the ſouth end of the needle, which let be 296; then, turning the inſtrument about, direct the ſights to G, noting then alſo what degrees are cut by the ſouth end of the needle, which ſuppoſe 247. This done always ſubtract the leſſer from the greater, as in this example, 247 from 296, the remainder is 49 degrees, which is the true quantity of the angle EKG.

(3.) CIRCUMFERENTOR, IMPROVED. See *Plate* LXIII. *fig.* 23. This is made by Mr Jones of Holburn. By a very ſimple contrivance, it is rendered ſufficient to take angles with the accuracy of a common theodolite; and by its angles of altitude and depreſſion may be obſerved as readily as horizontal ones. The improvement chiefly conſiſts in an arm or index, G, ſo applied to the centre of the compaſs box, and within it, that, at the time of obſerving, by only ſlipping a pin, *p* out, the circle of degrees alone may move round, and leave the index, G, fixed. This index will remain ſtationary, from its being attached to the ſocket that ſcrews on the head of the ſtaffs. On the end of this index, next the degrees in the box, there is graduated a nonius ſcale, by which the circle of 360 degrees is ſubdivided into 5 minutes or leſs if deſired. To take angles of altitude or depreſſions, the inſtrument is turned down on its ball and ſocket into a perpendicular poſition, and adjuſted to its level by a plumb line, *l*, that is hung on a pin at the back of the box, and made to coincide with a mark made thereon. Then by looking through the ſmall ſight holes, *s*, purpoſely made, the angles are ſhown on the circle of degrees by the nonius as before. The arms, A A of the inſtrument ſlip off, at BB, and the whole packs into a caſe only 5½ inches ſquare and 3 deep.

(1.) * CIRCUMFLEX. *n. ſ.* [*circumflexus*, Lat.] An accent uſed to regulate the pronunciation of ſyllables, including or participating the acute and grave.—The *circumflex* keeps the voice in a middle tune, and therefore in the Latin is compounded of both the other. *Holder*.

(2.) CIRCUMFLEX, in grammar. See ACCENT. It is ſeldom uſed among the moderns, unleſs to ſhow the omiſſion of a letter which made the ſyllable long and open. This is much more frequent with the French than among us: thus they write *pâte* for *paſte*: *tête* for *teſte*; *fûmes* for *fuſmes*, &c. They alſo uſe the circumflex in the participles; ſome of their authors writing *conneu*, *peu*, others *connû*, *pû*, &c. Father Buffier is at a loſs for the reaſon of this uſe of the circumflex. The form of the Greek circumflex was anciently the ſame with that of ours, viz. ^; being a compoſition of the other two accents ^ in one. But the copyiſts, changing the form of the characters, and introducing the running hand, changed alſo the form of the circumflex accent; and inſtead of making the juſt angle, rounded it off, adding a daſh through too much haſte; and thus formed an *s*, laid horizontally, which produced this figure ˜, inſtead of this ^.

* CIRCUMFLUENCE. *n. ſ.* [from *circumfluent*.] An incloſure of waters.

* CIRCUMFLUENT. *adj.* [*circumfluens*, Lat.] Flowing round any thing.—

I rule the Paphian race,
Whoſe bounds the deep *circumfluent* waves embrace,
A duteous people, and induſtrious iſle.
Pope's Odyſſey.

* CIRCUMFLUOUS. *adj.* [*circumfluus*, Lat.] Environing with waters.—

He the world
Built on *circumfluous* waters calm, in wide
Cryſtalline ocean. *Milton.*

* CIRCUMFORANEOUS. *adj.* [*circumforaneus*, Lat.] Wandering from houſe to houſe. As a *circumforaneous* fidler; one that plays at doors.

* *To* CIRCUMFUSE. *v. a* [*circumfuſus*, Lat.] To pour round; to ſpread every way.—Men ſee better, when their eyes are againſt the ſun, or candle, if they put their hand before their eye. The glaring ſun, or candle, weakens the eye; whereas the light *circumfuſed*, is enough for the perception. *Bacon.*

His army, *circumfus'd* on either wing. *Milt.*

* CIRCUMFUSILE. *adj.* [*circum* and *fuſilis* Lat.] That which may be poured or ſpread round any thing.—

Artiſt divine, whoſe ſkilful hands infold,
The victim's horn with *circumfuſile* gold.
Pope's Odyſſey.

* CIRCUMFUSION. *n. ſ.* [from *circumfuſe*.] The act of ſpreading round; the ſtate of being poured round.

* *To* CIRCUMGYRATE. *v. a.* [*circum* and *gyrus*, Lat.] To roll round.—All the glands of the body be congeries or various ſorts of veſſels, curled, *circumgyrated* and complicated together. *Ray.*

(1.) * CIRCUMGYRATION. *n. ſ.* [from *circumgyrate*.] The act of running round.—The ſun turns round his own axis in twenty-five days, from his firſt being put into ſuch a *circumgyration* *Cbyne.*

(2.) CIRCUMGYRATION, in natural philoſophy, denotes the whirling motion of any body round a centre; ſuch as that of the planets round the ſun.

* CIRCUMJACENT. *adj.* [*circumjacens*, Lat.] Lying round any thing; bordering on every ſide.

* CIRCUMITION. *n. ſ.* [*circumeo*, *circumitum*, Lat.] The act of going round. *Dict.*

* CIRCUMLIGATION. *n ſ.* [*circumligo*, Lat.] 1. The act of binding round. 2. The bond with which any thing is encompaſſed.

(1.) * CIRCUMLOCUTION. *n. ſ.* [*circumlocutio* Lat.] 1. A circuit or compaſs of words: periphraſis.—Virgil, ſtudying brevity, could bring theſe words into a narrow compaſs, which a tranſlator cannot render without *circumlocutions*. *Dryden.*—I muſt perfer the plain Billinſgate way of calling names, becauſe it would ſave abundance of time, loſt by *circumlocution*. *Swift.* 2. The uſe of indirect expreſſions.—Theſe people are not to be dealt withal, but by a train of myſtery and *circumlocution*. *L'Eſtrange.*

(2.) CIRCUMLOCUTION, is uſed, either when a proper term is not at hand, to expreſs a thing naturally and immediately by; or when one chooſes not to do it, out of reſpect, or for ſome other reaſon.

(3.) CIRCUMLOCUTION, in oratory, is the avoiding of ſomething diſagreeable or invonvenient to be expreſſed in direct terms: by intimating the ſenſe thereof in a kind of paraphraſe, ſo conceived as to ſoften or break the force of it. Thus Cicero unable to deny that Clodius was ſlain by Milo, owns it, with this circumlocution, "Milo's ſervants being prevented from aſſiſting their maſter, who was reported to be killed by Clodius; they, in his abſence, and without his privity, or conſent, did what every body would expect from their own ſervants on ſuch an occaſion."

* CIRCUMMURED. *adj.* [*circum* and *murus*, Lat.] Walled round; encompaſſed with a wall.

He hath a garden *circummur'd* with bricks.
Shak.

* CIRCUMNAVIGABLE. *adj.* [from *circumnavigate*.] That which may be ſailed round.—The being of Antipodes, the habitableneſs of the torrid zone, and the rendering the whole terraqueous globe *circumnavigable*. *Ray.*

* *To* CIRCUMNAVIGATE. *v. a.* [*circum* and *navigo*, Lat.] To ſail round.

* CIRCUMNAVIGATION. *n. ſ.* [from *circumnavigate.*] The act of ſailing round.—What he ſays concerning the *circumnavigation* of Africa, from the ſtraits of Gibraltar to the Red Sea, is very remarkable. *Arbuthnot.*

* CIRCUMNAVIGATOR. *n. ſ.* One that ſails round.

* CIRCUMPLICATION. *n. ſ.* [*circumplico,* Lat.] 1. The act of enwrapping on every ſide. 2. The ſtate of being enwrapped.

* CIRCUMPOLAR. *adj.* [from *circum* and *polar.*] Stars near the North pole, which move round it, and never ſet in the Northern latitudes, are ſaid to be *circumpolar ſtars.*

* CIRCUMPOSITION. *n. ſ.* [from *circum* and *poſition.*] The act of placing any thing circularly.—Now is your ſeaſon for *circumpoſition,* by tiles or baſkets of earth. *Evelyn.*

CIRCUMPOTATIO in antiquity, a funeral feaſt provided in honour of the dead. This was very frequent among the ancient Romans, as well as among the Athenians. Solon at Athens, and the decemviri at Rome, endeavoured to reform this cuſtom, thinking it abſurd that mirth and drunkenneſs ſhould mingle with ſorrow and grief.

* CIRCUMRASION. *n. ſ.* [*circumraſio.* Latin.] The act of ſhaving or paring round. *Dict.*

* CIRCUMROTATION. *n. ſ.* [*circum* and *roto,* Lat.] 1. The act of whirling round with a motion like that of a wheel. Circumvolution; circumgyration. 2. The ſtate of being whirled round.

* *To* CIRCUMSCRIBE. *v. a.* [*circum* and *ſcribo,* Lat.] 1. To incloſe in certain lines or boundaries. 2. To bound; to limit; to confine.—

The good Andronicus,
With honour and with fortune is return'd;
From whence he *circumſcribed* with his ſword,
And brought to yoke th' enemies of Rome.
Shak.

—The external circumſtances which do accompany men's acts, are thoſe which do *circumſcribe* and limit them. *Stillingfleet.*

CIRCUMSCRIBED, in geometry is ſaid of a figure which is drawn round another figure, ſo that all its ſides or planes touch the inſcribed figure.

* CIRCUMSCRIPTION. *n. ſ.* [*circumſcriptio,* Latin.] 1. Determination of particular form or magnitude.—In the *circumſcription* of many leaves flowers, fruits, and ſeeds, nature affects a regular figure. *Ray.* 2. Limitation; boundary; contraction; confinement.—

I would not my unhouſed free condition,
Put into *circumſcription* and confine. *Shak.*

* CIRCUMSCRIPTIVE. *adj.* [from *circumſcribe.*] Incloſing the ſuperficies; marking the form or limits on the outſide.—Stones regular, are diſtinguiſhed by their external forms; ſuch as is *circumſcriptive,* or depending upon the whole ſtone, as in the eagle ſtone, is properly called the figure. *Grew.*

* CIRCUMSPECT. *adj.* [*circumſpectum,* Lat.] Cautious: attentive to every thing watchful on all ſides.—Men of their own nature *circumſpect* and but at the time diſcountenanced and diſcontent. *Hayward.*—The judicious doctor had been very watchful and *circumſpect,* to keep himſelf from being impoſed upon. *Boyle.*

* CIRCUMSPECTION. *n. ſ.* [from *circumſpect.*] Watchfulneſs on every ſide; cautious; general attention.—Obſerve the ſudden growth of wickedneſs, for want of care and *circumſpection* the firſt impreſſions. *Clarendon.*—

* CIRCUMSPECTIVE. *adj.* [*circumſpicio, circumſpectum,* Latin.] Looking round every way; attentive; vigilant; cautious.—

No leſs alike the politick and wiſe,
All ſly ſlow things, with *circumſpective* eyes.
Pope.

* CIRCUMSPECTIVELY. *adv.* [from *circumſpective.*] Cautiouſly; vigilantly; attentively; with watchfulneſs every way; watchfully.

* CIRCUMSPECTLY. *adv.* [from *circumſpect.*] With watchfulneſs every way cautiouſly; watchfully; vigilantly.—Their authority weighs more with me than the concurrent ſuffrages of a thouſand eyes, who never examined the thing ſo carefully and *circumſpectly. Ray.*

* CIRCUMSPECTNESS. *n. ſ.* [from *circumſpect.*] Caution; vigilance; watchfulneſs on every ſide.—Travel forces *circumſpectneſs* on thoſe abroad, who at home are nurſed in ſecurity. *Wotton.*

* CIRCUMSTANCE. *n. ſ.* [*circumſtantia,* Lat.] 1. Something appendant or relative to fact: the ſame to a moral action as accident to a natural ſubſtance.—When men are ingenious in picking out *circumſtances* of contempt, they do kindle their anger much. *Bacon.*—Our confeſſing or concealing perſecuted truths, vary and change their very nature, according to different *circumſtances* of time, place and perſons. *South.* 2. The adjuncts of a fact, which make it more or leſs criminal; or make an accuſation more or leſs probable.—

Of theſe ſuppoſed crimes give me leave,
By *circumſtance,* but to acquit myſelf. *Shak.*

3. Accident; ſomething adventitious, which may be taken away without the annihilation of the principal thing conſidered.—

Senſe outſide knows, the ſoul thro' all things
ſees:
Senſe, *circumſtance;* ſhe doth the ſubſtance view.
Davies.

4. Incident, event: generally of a minute or ſubordinate kind.—He defended Carliſle with very remarkable *circumſtances* of courage, induſtry, and patience. *Clarendon.*—The ſculptor had in his thoughts the conqueror weeping for new worlds, or the like *circumſtance* in hiſtory. *Addiſon.* 5. Condition; ſtate affairs. It is frequently uſed with reſpect to wealth or poverty; as good or ill *circumſtances.*—None but a virtuous man can hope well in all *circumſtances. Bacon.*—When men are eaſy in their *circumſtances,* they are naturally enemies to innovations. *Addiſon.*

* *To* CIRCUMSTANCE. *v. a.* [from the noun.] To place in particular ſituation, or relation to the things.—

To worthieſt things,
Virtue, art, beauty, fortune, now I ſee,
Rareneſs or uſe, not nature, value brings,
And ſuch as they are *circumſtanc'd,* they be.
Donne.

* CIRCUMSTANT *adj* [*circumſtans,* Latin.] Surrounding; environing.—Its beams fly to viſit the remoteſt parts of the world, and it gives motion to all *circumſtant* bodies. *Digby.*

(1.) * CIRCUMSTANTIAL. *adj.* [*circumſtantialis*, low Lat.] 1. Accidental; not eſſential.—This juriſdiction in the eſſentials of it, is as old as chriſtianity; and thoſe *circumſtantial* additions of ſecular encouragement, chriſtian princes thought neceſſary. *South.*—Who would not prefer a religion that differs from our own in the *circumſtantials*, before one that differs from it in the eſſentials? *Addiſon.* 2. Incidental; happening by chance; caſual.—

Virtue's but anguiſh, when 'tis ſeveral,
By occaſion wak'd, and *circumſtantial.* *Donne.*

3. Full of ſmall events; particular detailed.—He had been provoked by men's tedious and *circumſtantial* recitals of their affairs, or by their multiplied queſtions about his own. *Prior.*

(2.) CIRCUMSTANTIAL EVIDENCE, in law, or the doctrine of preſumption, takes place next to poſitive proof. Circumſtances which either neceſſarily or uſually attend facts of a particular nature, that cannot be demonſtratively evinced, are called *preſumptions*, and are only to be relied on till the contrary be actually proved.

* CIRCUMSTANTIALITY. *n. ſ.* [from *circumſtantial*] The appendage of circumſtances; the ſtate of any thing as modified by circumſtances.

* CIRCUMSTANTIALLY. *adv.* [from *circumſtantial.*] 1. Accordingly to circumſtance; not eſſentially; accidentally.—Of the fancy and intellect, the powers are only *circumſtantially* different. *Glanville.* 2. Minutely; exactly; in every circumſtance or particular.—Lucian agrees with Homer in every point *circumſtantially.* *Broome.*

* *To* CIRCUMSTANTIATE. *v. a.* [from *circumſtance.*] 1. To place in particular circumſtances; to inveſt with particular accidents or adjuncts.—If the act were otherwiſe *circumſtantiated*, it might will that freely, which now it wills freely. *Bramhall.* 2. To place in a particular condition, as with regard to power or wealth.—A number infinitely ſuperiour, and the beſt *circumſtantiated* imaginable, are for the ſucceſſion of Hanover. *Swift.*

CIRCUMSTANTIBUS, in law, a term uſed for ſupplying and making up the number of jurors (in caſe any impanelled appear not, or appearing are challenged by any party,) by adding to them ſo many of the perſons preſent as will make up the number, in caſe they are properly qualified.

* *To* CIRCUMVALLATE. *v. a.* [*circumvallo*, Lat.] To incloſe round with trenches or fortifications.

* CIRCUMVALLATION. *n. ſ.* [from *circumvallate*, Lat.] 1. The art or act of caſting up fortifications round a place.—When the czar had firſt acquainted himſelf with mathematical learning, he practiſed all the rules of *circumvallation* and contravallation at the ſiege of a town in Livonia. *Watts.* 2. The fortification or trench thrown up round a place beſieged.—This gave reſpite to finiſh thoſe ſtupendous *circumvallations* and barricadoes, reared up by ſea and land. *Howel.*

* CIRCUMVECTION. *n. ſ.* [*circumvectio*, Latin.] 1. The act of carrying round. 2. The ſtate of being carried round.

* *To* CIRCUMVENT. *v. a.* [*circumvenio*, Lat.] To deceive; to cheat; to impoſe upon; to delude.—He fearing to be betrayed, or *circumvented* by his cruel brother, fled to Barbaroſſa. *Knolles.*—As his malice is vigilant, he reſteth not to *circumvent* the ſons of the firſt deceived. *Brown.*

* CIRCUMVENTION. *n. ſ.* [from *circumvent.*] 1. Fraud; impoſture; cheat; deluſion.—The inequality of the match between him and the ſubtleſt of us, would quickly appear by a fatal *circumvention*: there muſt be a wiſdom from above to over-reach this helliſh wiſdom. *South.*—If he is in the city, he muſt avoid haranguing againſt *circumvention* in commerce. *Collier.* 2. Prevention; pre-occupation. This ſenſe is now out of uſe.—

Whatever hath been thought on in this ſtate,
That could be brought to bodily act, ere Rome
Had *circumvention.* *Shak.*

* *To* CIRCUMVEST. *v. a.* *circumveſtio*, Lat.] To cover round with a garment.—

Who on this baſe the earth did'ſt firmly found,
And mad'ſt the deep to *circumveſt* it round. *Wotton.*

* CIRCUMVOLATION. *n. ſ.* [from *circumvolo*, Lat.] The act of flying round.

* *To* CIRCUMVOLVE. *v. a.* [*circumvolvo*, Lat.] To roll round; to put into a circular motion.—Could ſolid orbs be accommodated to phænomena, yet to aſcribe each ſphere an intelligence to *circumvolve* it, were unphiloſophical. *Glanville.*

(1.) * CIRCUMVOLUTION. *n. ſ.* [*circumvolutus*, Lat.] 1. The act of rolling round. 2. The ſtate of being rolled round.—The twiſting of the guts is really either a *circumvolution*, or inſertion of one part of the gut within the other. *Arbuthnot.* 3. The thing rolled round another.—Conſider the obliquity or cloſeneſs of theſe *circumvolutions*; the nearer they are, the higher may be the inſtrument. *Wilkins.*

(2.) CIRCUMVOLUTION, in architecture, denotes the torus of the ſpiral line of the Ionic order.

(1.) * CIRCUS. CIRQUE. *n. ſ.* [*circus*, Latin.] An open ſpace or area for ſports, with ſeats round for the ſpectators.—A pleaſant valley, like one of thoſe *circuſes*, which, in great cities ſomewhere, doth give a pleaſant ſpectacle of running horſes. *Sidney.*—The one was about the *cirque* of Flora, the other upon the Tarpeian mountain. *Stillingfleet.*—

See the *cirque* falls! the unpillar'd temple nods;
Streets pav'd with heroes, Tyber choak'd with gods. *Pope.*

(2.) CIRCUS is by ſome derived from CIRCE, to whom Tertullian attributes the invention. Caſſiodorus ſays, it comes from *circuitus.* The Romans, Servius obſerves, had originally no other circus but that made by the Tiber on one ſide, and a paliſade of naked ſwords on the other. Hence, according to Iſidore, came the term *ludi circenſes*, *quaſi circum enſes.* But Scaliger ridicules that etymology. The Roman circus was a large oblong edifice, arched at one end; encompaſſed with porticoes, and furniſhed with rows of ſeats, placed aſcending over each other. In the middle was a kind of foot bank, or eminence, with obeliſks, ſtatues, and poſts at each end. This ſerved them for the courſes of their *bigæ* and *quadrigæ*. There were no leſs than ten circuſes at Rome: the largeſt was built by the elder Tarquin, called *Circus Maximus*, between the Aventine and Palatine mounts. It was ſo called, either becauſe of its vaſt circumference, or becauſe the great games were celebrated in it; or becauſe it was conſecrated to the great gods, viz. to Vertumnus, Neptune, Jupiter, Juno, Minerva, and the Dii Penates of Rome. Dionyſius Halicarnaſſenſis ſays, that it was 3½ ſtadia in length, and 4 jugera broad; and theſe meaſures, according to Pliny, allowing the Roman ſtadia 625 Roman feet, each of which is 12 inches, will give for the length 2187 Roman feet, or ſomewhat more than 3 Engliſh furlongs; and as to the breadth, allowing for each of the jugera 240 Roman feet, it will be 960 Roman feet. It was beautified and enlarged by the Roman emperors, ſo as to ſeat 250,000 ſpectators. The moſt magnificent circuſes were thoſe of Auguſtus and Nero. There are ſtill ſome remains of the circuſes at Rome, at Niſmes, and other places. The Romans were exceſſively fond of the games exhibited in the circus.

(3.) **CIRCUS, GAMES OF THE**, or the **CIRCENSIAN GAMES**, were combats celebrated in the circus, in honour of Conſus the god of councils; and thence alſo called *Conſualia*. They were alſo called *Ludi Romani*, Roman games, either on account of their antiquity, as being coeval with the Roman people, or becauſe eſtabliſhed by the Romans; and the games held there, the great games, *ludi magni*, becauſe celebrated with more expence and magnificence than others; and becauſe held in honour of the great god Neptune, who was their Conſus. Thoſe who ſay they were inſtituted in honour of the ſun, confound the *pompa circenſis*, or proceſſion of the circus, with the games. The games of the circus were inſtituted by Evander, and re-eſtabliſhed by Romulus: the pomp, or proceſſion, was only a part of the games, making the prelude thereof, and conſiſting of a ſimple cavalcade of chariots. Till the time of the elder Tarquin, they were held in an iſland of the Tiber; and were called *Roman games*; after that prince had built the circus, they took their name from it. There were ſix kinds of exerciſes in the circus; viz. 1. Wreſtling, and fighting with ſwords, ſtaves, and pikes: 2. Racing: 3. SALTATIO, dancing: 4. DISCI, quoits, arrows, and ceſtus; all which were on foot: 5. Horſe courſing; 6. Courſes of chariots, with 2 horſes or with 4. In this laſt exerciſe, the combatants were at firſt divided into 2 ſquadrons; then into 4; each bearing the names of the colours they wore; *factio alba, ruſſea*, &c. Oenomaus invented this method of diſtinguiſhing the ſquadrons by colours. At firſt there were only white and red, then green and blue were added. The green was for thoſe who repreſented the earth; the blue for the ſea, &c. Domitian added two more colours, but they did not continue.

CIRE, a town of France, in the department of Lower Charente, and ci-devant province of Saintonge. It is the capital of a canton in the diſtrict of Rochefort, 7½ m. N. of Rochefort.

CIRELLA, a town of Naples, in the province of Calabria Citerior, 8 miles SSE. of Scalea. It had formerly gold and ſilver mines.

(1.) **CIRENCESTER**, an ancient town in Glouceſterſhire. It was ſtrongly fortified with walls in the time of the Romans. The ruins of the walls and ſtreet are, or were lately, to be ſeen in the adjacent meadows, where many Roman coins, chequered pavements, and inſcriptions on marble, have been found. Two of the Roman conſular ways croſs each other at this town. The foſſe-way, which comes from Scotland, paſſes through this county and town to Totneſs in Devonſhire. The other, called *Irmin-ſtreet*, comes from Glouceſter, and runs along to Southampton. Some years ago was diſcovered, by digging in a meadow near the town, an ancient building under ground, 50 feet long, 40 broad, and 4 high, and ſupported by two brick pillars, curiouſly inlaid with ſtones of various colours, ſuppoſed to have been a Roman bath. Cirenceſter has now but one church, in the windows of which are the remains of very valuable painted glaſs. The town is governed by 2 high conſtables, and 14 wardſmen, who govern 7 diſtinct wards; and it ſends two members to parliament. It has a free ſchool, a charity ſchool, with ſeveral alms-houſes; and is ſeated on the river Churn, 18 miles SE. of Glouceſter, 36 NE. of Briſtol, and 89 W. by N. of London. Lon. 0. 2. W. Lat. 51. 42. N.

(2.) **CIRENCESTER**, or **MARCUS HOOK**, a ſmall town of Pennſylvania, in Delaware county, ſeated on the NW. ſide of the Delaware: 20 miles SW. of Philadelphia.

CIRENZA, a city of Naples, capital of the Baſilicate, with an archbiſhop's ſee. It was formerly a conſiderable place, but is now of ſmall conſequence. It is ſeated on the river Branduſo, at the foot of the Apennine mountains, in Lon. 16. 44. E. Lat. 40. 48. N.

CIREY, a town of France, in the department of Meurthe, and ci-devant province of Lorrain. It is the capital of a canton in the diſtrict of Blamont, 3 miles E. of Blamont.

CIRIE, a town of Italy, and capital of a marquiſate, in the principality of Piedmont, ſituated near the foot of the Grecian Alps, on the Doria. It contains three pariſh churches, and ſeveral religious houſes. It is 8 miles NW. of Turin.

CIRO-FERRI, an excellent Italian painter and architect, born at Rome in 1614. He was the diſciple of Peter de Cortona, whoſe deſigns he imitated with ſuch exactneſs, that it is difficult to diſtinguiſh them. He was eſteemed by Pope Alexander VII. and his three ſucceſſors, and died at Rome in 1689.

CIRRHUS, or **CIRRUS**, a claſper, or tendril. See BOTANY, *Index*. Tendrils are either *ſimple*, *i. e.* compoſed of one fibre or chord, as in the vetch; or *compound*, *i. e.* conſiſt of 2, 3, or more, as in the everlaſting pea. Bitter ſweet, ſolanum, dulcamara, bignonia, and ivy, ſend forth tendrils which plant themſelves like roots in the adjacent walls, or the bark of the neighbouring trees. Dr Grew ſays, they are like trunk roots, a mean betwixt a root and a trunk, but a compound of both, as may be gathered from their circumvolutions, in which they mutually aſcend and deſcend. In the mounting of the trunk, they ſerve for ſupport.

Thus, in vines, the branches being very long, fragile, and ſlender, would be liable to frequent breaking, unleſs, by means of their claſpers, they were mutually connected together; ſo that the whole care is divided between the gardener and nature: the former, with his ligaments of leather, ſecures the main branches; and the latter, with her tendrils, ſecures the leſs. Their aptitude to this end is ſeen in their convolutions, a motion not proper to any other part: and alſo in their toughneſs, which is ſo much the more remarkable, as they are ſlenderer than the branches from which they proceed. In the trailing of the trunk, tendrils ſerve for ſtabilement and ſhade: thus, in cucumbers, the trunk and branches being long and fragile, would be driven to and fro by the winds, to the great prejudice of the plants and their tender fruits, were they not, by theſe ligaments, held faſt together, and preſerved in aſſociation and good fellowſhip. Theſe claſpers ſerve likewiſe for ſhade; ſo that a natural arbour is formed by the branches of the cucumber, in the ſame manner as an artificial one is made by tangling together the twigs of trees; for the branches, by the linking of their claſpers, being couched together, the tender fruits lie under the umbrage of a bower made of their own leaves. Moſt of the pea-bloom flowers have twining tendrils, that is, which wind to the right and back again.

CIRRI, in ichthyology, certain oblong and ſoft appendages, not unlike little worms, hanging from the under jaws or mouths of ſome fiſhes: theſe cirri, commonly tranſlated *beards*, afford marks to diſtinguiſh the different ſpecies of the fiſhes on which they are found.

CIRTA, in ancient geography, the metropolis and royal reſidence, in the inland parts of Numidia Proper, near the Ampſaga. It was very rich and was called *Colonia Sittianorum*, when in the hands of Syphax. The colony was led by one P. Sittius, under the auſpices of Cæſar, and was furnamed *Julia*. It is now called CONSTANTINA, and belongs to Algiers. Lon. 7. 0. Lat. 35. 30. N.

(1.) **CISALPINE**, *adj.* any thing on this ſide the Alps. The Romans divided Gaul and the country now called LOMBARDY, into Ciſalpine and Tranſalpine. That which was *Ciſalpine* with regard to the Romans was *Tranſalpine* with regard to us; *Cis* ſignifying on *this ſide*, and *Trans* on the *farther ſide*.

(2.) **CISALPINE REPUBLIC**, a late extenſive democratic ſtate of Italy, which comprehended what was formerly called Auſtrian Lombardy, the territories of Bergamo, Breſciano, and Cremona, the town and fortreſs of Mantua, the territory of Peſchiara, part of the ci devant Venetian States, all the ancient territory of Modena, the principalities of Mantua and Carrara, the territory of Chiavenne, and the three legations of Bologna, Ferrara, and Romagna, a part of the Veroneſe, the cidevant duchy of Maſſa, and the Valteline: being bounded on the N. by Switzerland, the Tyrol, and the late Maritime diviſion of Auſtria; on the E. by the Adriatic and Auſtria Proper, on the S. by the late Roman and Etruſcan Republics: the Mediterranean and Parma, and on the W. by Parma and Piedmont, lying between Lon. 9. 0. and 14 E. and between Lat. 43. and 47. 0. N. Dr Oppenheim ſtates it to have been created by France 1796; but the Dr errs in his chronology, for only a ſmall part of it, viz. the ſtates of Bologna, Ferrara, Modena, and Reggio, had begun to aſſume the democratic form on the 16th of Oct. 1796, under the title of the *Ciſpadane Republic*: and their congreſs did not hold their firſt meeting at Reggio till the 27th Dec. 1796; nor was even the conſtitution of this ſmall republic completed till the 12th March 1797. Mantua was not ſurrendered by the Auſtrians till the 2d Feb. 1797, and it was a conſiderable time after theſe events, before it was determined, whether the ſtates that compoſed the Ciſalpine Republic ſhould be conjoined in one, or divided into two or more republics. At laſt the former was agreed upon, and a conſtitution ſimilar to that of the late French republic was adopted in Sept. 1797. The Ciſalpine republic was finally eſtabliſhed and defined by the treaty of Campo-Formio, on the 17th Oct. 1797; and, acknowledged by the Emperor, the Pope, the kings of Sardinia, and Spain, and the French, Batavian and Helvetic republics. Bonaparte, the firſt conſul of France, was thereafter choſen preſident of the republic; and the name *Ciſalpine* aboliſhed for that of *Italian*; which, in May, 1805, gave way to the more pompous title of the *Kingdom of Italy*, of which the Italian republic forms the principal part. When the French people had yielded up that freedom, (if it can be ſaid they had as yet enjoyed any thing like freedom,) to gain which they had ſuffered the greateſt calamities, murdered a lawful ſovereign, and waged a bloody war of more than ten years endurance, by ſubmitting to a military deſpotiſm, in the perſon of Bonaparte, under the title of *Emperor of the Gauls*, it was natural to expect that the influence which this uſurper had acquired as preſident of the Italian Republic, would now be as much exerted for its ſubverſion, as it had once been for its eſtabliſhment. We accordingly ſee the whole of this ſhort-lived republic transformed into a legal diadem for the head of the French dynaſty, which has alſo been the caſe with all thoſe numerous republics which his influence and intrigues had raiſed up in this ill-fated portion of Europe. The Ciſalpine or Italian republic was divided into 20 departments, Olone, Verbano, Lario, Montagne, Teſſino, Adda, Oglio, Mella, Benaco, Upper Po, Mincio, Croſtolo, Appennines, Panaro, Reno, Upper Padua, Lower Po, Amone, and Rubicon. Each of theſe departments returned a number of members to the legiſlative body of the republic, in proportion to its population. The total number of deputies was 240. The number for each department increaſed or diminiſhed by arithmetical progreſſion, by the ratio of three, according to their reſpective population; thus; thoſe in which there were feweſt inhabitants had ſix, and thoſe which have moſt, only fifteen. An arbitrary attempt was made by Brune, the French general, on the 19th Oct. 1798, to alter the conſtitution, by reducing the number of departments to ten, and of repreſentatives to 120, but the meaſure was ſo unpopular, that the French directory, on the 25th Dec. 1798, annulled the act of Brune, and reſtored the conſtitution of 1797. The total amount of the population of the republic, according-ing to the report of the committee which inquired into the ſtate of each department, was only 3.239571; but it is generally believed, that this calculation was far below the truth; and the Swiſs provinces Valteline, Chiavenna, and Bormio, were added to the republic, in Nov. 1797, after the above diviſion had taken place; comprehending an extent of 314 ſquare miles, and a population of 100,000; beſides which, ſeveral diſtricts in the Parmeſan have alſo been annexed to it, containing an additional population of 4812; and the four Italian bailiwics, containing a population of 103,000 not enumerated in 1797. The total population of the republic was therefore eſtimated by Dr Oppenheim at 3,447.383; and its total extent at 3567 ſquare miles, being about 966 perſons to a ſquare mile. The exports of this republic, in horned cattle, horſes, wool, flax, ſilks, rice, cheeſe, &c. he eſtimated at 10 millions of guilders, or, 1,166,666l. ſterling; and the imports at 4-5ths of that ſum. The revenue had not hitherto exceeded 816,666l. but he is of opinion it might have been increaſed, without being burdenſome, to 1,250,000l. The rivers afford very profitable fiſheries.

CISLEU, in Hebrew chronology, the 9th month of their eccleſiaſtical, and 3d of their civil, year, anſwering nearly to our November.

CISMAR, a town of Germany, in the duchy Holſtein, near the Baltic Sea, 17 m. N. of Travemunde. Lon. 11. 12. E. Lat. 54. 14. N.

CISME, or Chisme. See Chisme.

(1.) CISMONE, a river of Germany, in Tirol, which runs into the Brenta, near Koſel.

(2.) Cismone, a town on the Brenta, in the Treviviane, and territory of Fettre; near which the French under Bonaparte defeated the Auſtrians in Sept. 1796. It lies 18 miles N. of Vicenza, and 24 NW. of Treviſo.

CISOING, or Chisoin, a town of France, in the department of the North, and ci-devant province of French Flanders; 6 miles NNW. from Orchies. Lewis XV took up his reſidence in it during the war in 1744.

(1.) CISPADANA, or the Cispadane republic, was a ſmall democratic ſtate, founded in October 1796, upon the plan of the French government. It was the firſt of the kind in Italy, and laid the foundation of the Cisalpine republic; which ſee.

(2.) Cispadana gallia, in ancient geography, a diſtrict of Italy, to the S. of Po, occupied by the Gauls in the time of the kings of Rome, ſeparated from Liguria on the W. (as is thought) by the Iria, running from S. to N. into the Po; bounded on the S. by the Appenine, and on the E. by the Adriatic. The term is formed analogically, with reſpect to Rome. Ptolemy calls the *Gallia Ciſpadana* peculiarly Gallia Togata, and deſcribes it as extending between the Po and Appenines, to the Sapis and Rubicon.

CISPADANI, the ancient inhabitants of Gallia Ciſpadana, who, as well as the Transpadani, (*i. e.* the people on the *farther ſide* of the Po, with regard to Rome,) are often mentioned by Cicero, Tacitus, and Suetonius, as well as in many ancient inſcriptions.

(1.) CISSA, or Cissum, a town of Hither Spain, in Lacetania, on the E. ſide of the Iberus, thought to be Guissona; where the Carthaginians were firſt defeated by Scipio.

(2.) Cissa, a town of Thrace, ſituated on the river Ægos-Potamus, which Scylax ſeems to call Cressa, or Crissa; ſo that the reading is doubtful.

(3.) Cissa. See Chichester.

CISSAMPELOS, in botany, a genus of the monadelphia order, belonging to the diœcia claſs of plants; and in the natural method ranking under the 11th order *Sarmentaceæ*. The male calyx is tetraphyllous; no corolla; the nectarium wheel-ſhaped: 4 ſtamina with their filaments grown together. The female calyx is monophyllous and ligulated roundiſh, or like a piece of garter a little roundiſh. There is no corrolla; three ſtyles, and a monoſpermous berry. There are two ſpecies, viz.

1. Cissampelos caapeba, a native of the warmeſt parts of America. The root applied externally, is ſaid to be an antidote againſt the bites of venomous ſerpents. The plant being infuſed in water, quickly fills the liquor with a mucilaginous ſubſtance, which is as thick as jelly; whence the name of *freezing wyth*, by which this genus of plants has been diſtinguiſhed by the Brazilians.

2. Cissampelos pareira is alſo a native of the warmeſt parts of America.

CISSAN-CÆSTER. See Chichester.

(1.) CISSBURY hill, near Selſey Suſſex.

(2.) Cissbury hill, near Wandſyke, Wilts.

CISSOID, in geometry, a curve of the ſecond order, firſt invented by Diocles, whence it is called the *ciſſoid of Diocles*. See Fluxions.

CISSUS, the wild grape, a genus of the monogynia order, belonging to the tetrandria claſs of plants; and in the natural method ranking under the 46th order, *Hederaceæ*. The berry is monoſpermous, ſurrounded by the calyx, and a quadripartite corolla. There are 4 ſpecies, all natives of Jamaica, and ſome of the other iſlands in the warmeſt parts of America. They ſend out ſlender branches, having tendrils at their joints, by which they faſten to the neighbouring trees, buſhes, and any other ſupport, mounting to a conſiderable height. The fruit of ſome of the ſpecies are eaten by the negroes.

* CIST. *n. ſ.* [*ciſta*, Lat.] A caſe; a tegument; commonly uſed in medicinal language for the coat or incloſure of a tumour.

CISTEAUX. See Citeaux.

* CISTED. *adj.* [from *ciſt*.] Incloſed in a ciſt, or bag.

CISTERTIANS, in church hiſtory, a religious order founded in the 11th century by St Robert, a Benedictine. They became ſo powerful, that they governed all Europe, both in ſpirituals and temporals. Cardinal de Vitri deſcribing their obſervances, ſays, they neither wore ſkins nor ſhirts; nor ever eat fleſh, except in ſickneſs; and abſtained from fiſh, eggs, milk, and cheeſe; they lay upon ſtraw beds, in tunics and cowls: they roſe at midnight to prayers; they ſpent the day in labour, reading, and prayer; and in all their exerciſes obſerved a continual ſilence The habit of the ciſtercian monks is a white robe, in the nature of a caſſock, with a black ſcapulary and hood, and is girt with a wooden girdle. The nuns wear a white tunic, and a black ſcapular and girdle. There is a famous ciſtercian abbey ſtill to be ſeen in the pariſh of New-Abbey, (to which it gave name,) in Kirkcudbright-ſhire; which was founded by Dervigilla, the mother of John Baliol, king of Scotland.

(1.) * CISTERN. *n. ſ.* [*ciſterna*, Lat.] 1. A receptacle of water for domeſtick uſes.—'Tis not the rain that waters the whole earth, but that which falls into his own *ciſtern*, that muſt relieve him. *South.* 2. A reſervoir; an incloſed fountain.

Had no part as kindly ſtaid behind,
In the wide *ciſterns* of the lakes confin'd;
Did not the ſprings and rivers drench the land,
Our globe would grow a wilderneſs of ſand.
Blackmore.

3. Any receptacle or repoſitory of water.—

So half my Egypt were ſubmerg'd, and made
A *ciſtern* for ſcal'd ſnakes. *Shakeſpeare.*

(2.) Ciſterns, ancient. Anciently there were ciſterns all over the country in Paleſtine. There were ſome likewiſe in cities and private houſes. As the cities for the moſt part were built on mountains, and the rains fell regularly in Judea at two ſeaſons in the year only, in ſpring and autumn, the people were obliged to keep water in ciſterns in the country for the uſe of their cattle, and in the cities for the conveniency of the inhabitants. There are ſtill ciſterns of very large dimenſions to be ſeen in Paleſtine, ſome whereof are 150 paces long, and 54 wide. There is one at Ramah 32 paces in length, and 28 in breadth. Wells and ciſterns, ſprings and fountains, are generally uſed ſynonimouſly in ſcripture. Authors mention a ciſtern at Conſtantinople, the vaults of which are ſupported by two rows of pillars, 212 in each row, each pillar being two feet in diameter. They are planted circularly, and *in radii* tending to the centre.

(1.) CISTERNA, a town of Italy, in Piedmont, 12 miles ESE. of Turin.

(2.) Ciſterna Nuova, a town of Naples, in the province of Capitanata, 4 miles SE. of mount Angelo.

CISTERNINO, a town of Naples, in the province of Bari, 16 miles SSE. of Monopoli.

CISTRUM See Cittern.

(1.) * CISTUS. *n. ſ.* [Lat.] The name of a plant. The ſame with Rockroſe.

(2.) Ciſtus, in botany, a genus of the monogynia order, belonging to the polyandria claſs of plants; and in the natural method, ranking under 20th order, *Rotaceæ.* The corolla is pentapetalous; the calyx pentaphyllous, with two of its leaves ſmaller than the reſt. The ſeeds are contained in a capſule. There are 37 ſpecies, moſt of them natives of the ſouthern parts of Europe, but hardly enough to bear the open air in this country. They are beautiful evergreen ſhrubs, generally very branchy quite from the bottom, and forming diffuſed heads. They are very ornamental in gardens, not only as evergreens, making a fine variety at all ſeaſons with their leaves of different figures, ſizes, and ſhades of green and white, but alſo as firſt-rate flowering ſhrubs, being very profuſe in moſt elegant flowers of white, purple, and yellow colours. Theſe flowers only laſt for one day; but there is a continual ſucceſſion of new ones for a month or ſix weeks on the ſame plant; and when there are different ſpecies, they exhibit a conſtant bloom for near 3 months. They are propagated either by ſeeds or cuttings, and thrive beſt in a dry ſoil. Their proper ſituation in ſhrubbery works ſhould be towards the front of the clumps and other compartments, in aſſemblage with the choiceſt ſhrubs of ſimilar growth, diſpoſing them ſo as to make a variety, and to have ſhelter from the other plants; but they ought by no means to be crowded. Gum labdanum is found upon a ſpecies of ciſtus which grows naturally in the Levant, and is therefore called labdanifera. See Labdanum.

* CIT. *n. ſ.* [contracted from *citizen.*] An inhabitant of a city, in an ill ſenſe. A pert low townſman a pragmatical trader.—Study your race, or the ſoil of your family will dwindle into *cits* or ſquires, or run up into wits or madmen. *Tatler.*

(1.) * CITADEL. *n. ſ.* [*citadelle*, French.] A fortreſs; a caſtle, or place of arms in a city.—As he came to the crown by unjuſt means, as unjuſtly he kept; by force of ſtranger ſoldiers in *citadels*, the neſts of tyranny and murderers of liberty. *Sidn.*

(2.) *A* Citadel is commonly fortified with 5 or 6 baſtions, built on a convenient ground near a city, that it may command it in caſe of a rebellion.

(1.) CITADELLA, a ſea-port town of the iſland of Minorca, with a good harbour on the NW. coaſt, ſurrounded with walls and baſtions. It contains two churches and four convents, and 600 houſes. It was taken with the whole iſland, by general Stanhope and the confederate fleet in 1708, and ceded to Great Britain by the treaty of Utrecht in 1713. It was taken by the French, after a brave defence in 1756; but reſtored at the peace. In 1782, it was taken by the Spaniards, and confirmed to them at the ſubſequent peace. It is 27 miles W. of Port Mahon. Lon. 3. 30. E. Lat. 39. 58. N.

(2.) Citadella, a podeſtaria or bailiwick of the late Maritime diviſion of Auſtria, in the Paduano, bounded on the N. by Baſſano, on the E. by Treviſo, and W. by Vicenza; containing one town, (N° 3.) 33 large villages, and 26,140 inhabitants.

(3.) Citadella, the capital of the above bailiwic, ſituated on the Brentella, oppoſite Caſtel Franco, between Vicenza and Trevigno. It was built in 1220, and was one of the ſcenes of the cruelties of the tyrant Ezzelius. It contains 5800 inhabitants, and has a bank for lending money on pledges, with good weekly markets.

(4.) Citadella, a town of Italy, 19 miles NNW. of Padua, ſeated near the Brente, between Vicenza and Trevigno, in the ci-devant Venetian territories.

(5.) Citadella Pieve, a town of Italy, late in the province of Perugino, afterwards in the Roman republic, and department of Traſimeno, the ſee of a biſhop, 18 miles W. of Perugia, and 68 N. of Rome.

CITADENESCA, in natural hiſtory, a name given by ſome writers to the Florentine marble, which is ſuppoſed to repreſent towns, palaces, ruins, rivers, &c. Theſe delineations are merely accidental, and are commonly much aſſiſted by the imagination, though the natural lines of a ſtone may ſometimes luckily enough repreſent the ruins of ſome ancient building, or the courſe of a river. In England there is a kind of SEPTARIA, or *ludus Helmontii*, which has ſometimes pretty beautiful, though very irregular, delineations of this kind. The Florentine marble, as we ſee it wrought up in the ornaments of cabinets, &c. owes a great deal to the ſkill of the workmen, who always pick out the proper pieces from the maſs, and diſpoſe them in the work ſo as to repreſent what they pleaſe.

* CITAL. *n. ſ.* [from *cite.*] 1. Reproof; impeachment.—

He made a bluſhing *cital* of himſelf,
And chid his truant youth. *Shakeſpeare.*

2. Summons; citation; call into a court. 3. Quotation; citation.

* CITATION. *n. ſ.* [*citatio*, Latin.] 1. The calling a perſon before the judge, for the ſake of trying the cauſe of action commenced againſt him. *Ayliffe's Parergon.* 2. Quotation: the adduction of any paſſage from another author; or of another man's words. 3. The paſſage or words quoted; a quotation.—The letter-writer cannot read theſe *citations* without bluſhing, after the charge he hath advanced. *Atterbury.*—View the principles in their own authours, and not in the *citations* of thoſe who would confute them. *Watts.* 4. Enumeration; mention.—Theſe cauſes effect a conſumption, endemick to this iſland: there remains a *citation* of ſuch as may produce it in any country. *Harvey.*

* CITATORY. *adj.* [from *To cite.*] Having the power or form of citation.—If a judge cite one to a place, to which he cannot come with ſafety, he may freely appeal, though an appeal be inhibited in the letters *citatory*. *Ayliffe.*

* *To* CITE. *v. a.* [*cito*, Latin.] 1. To ſummon to anſwer in a court.—This power of *citing*, and dragging the defendant into court, was taken away. *Ayliffe.* 2. To enjoin; to call upon another authoritatively; to direct; to ſummon.—

I ſpeak to you, Sir Thurio;
For Valentine, I need not *cite* him to it. *Shak.*
This ſad experience *cites* me to reveal,
And what I dictate is from what I feel. *Prior.*

3. To quote.—Demonſtrations in ſcripture may not otherwiſe be ſhewed than by *citing* them out of the ſcripture. *Hooker.*—That paſſage of Plato, which I *cited* before. *Bacon.*—In baniſhment he wrote thoſe verſes, which I *cite* from his letter. *Dryd.*

CITEAUX, or CISTEAUX, a town of France, in the ci-devant province of Burgundy, long famous for the principal abbey of the Ciſtercian order.

* CITER. *n. ſ.* [from *cite.*] 1. One who cites in a court. 2. One who quotes; a quoter.—I muſt deſire the *citer* henceforward to inform us of his editions too. *Atterbury.*

CITHÆRON, in ancient geography, a mountain and foreſt of Bœotia, celebrated both in fable and ſong. To the W. it ran obliquely, a little above the Sinus Criſſæus, taking its riſe contiguous to the mountains of Megara and Attica; then levelled into plains, it terminates at Thebes, famous for the fate of Pentheus and Actæon; the former torn by the Bacchæ, the latter by his dogs; as alſo for the *orgia*, or revels of Bacchus.

CITHARA, in antiquity, a muſical inſtrument, the preciſe ſtructure of which is not known; ſome think it reſembled the Greek Δ; and others the ſhape of a half moon. At firſt it had only 3 ſtrings, but the number was at different times increaſed to 8, to 9, and laſtly to 24. It was uſed in entertainments and private houſes, and played upon with a plectrum or quill, like the lyre.

CITHAREXYLON, FIDDLE-WOOD: A genus of the angioſpermia order, belonging to the didynamia claſs of plants; and in the natural method ranking under the 40th order, *Perſonatæ*. The calyx is quinquedentated, campanulated wheel-ſhaped, with its ſegments villous on the upper ſide, equal. The fruit is a diſpermous berry; the ſeeds bilocular. There are two ſpecies, both natives of the warmer parts of America, where they grow to be large trees, and are adorned with white flowers growing in ſpikes. In Britain they appear only as ſhrubs, and muſt be conſtantly retained in the ſtove, where they make a fine appearance, being beautiful ever-greens. They may be propagated either by ſeeds or cuttings.

* CITHERN. *n. ſ.* [*cithara*, Latin.] A kind of harp; a muſical inſtrument.—At what time the heathen had profaned it, even in that was it dedicated with ſongs and *citherns*, and harps and cymbals. *Mac.*

CITAIBEB, a town of Morocco, in the province of Tedla.

CITIUM, CETIUM, or CITTIUM, in ancient geography, a town in the S. of Cyprus, famous for the birth of Zeno, founder of the ſect of STOICS; 200 ſtadia W. of Salamis. It was founded by a colony of Phœnicians, called *Chetim*: and hence not only Cyprus, but the other iſlands and many maritime places, are called *Chetim* by the Hebrews. It is now called *Chiti*.

(1.) * CITIZEN. *n. ſ.* [*civis*, Lat. *citoyen*, Fr.] 1. A freeman of a city; not a foreigner; not a ſlave. —All inhabitants within theſe walls are not properly *citizens*, but only ſuch as are called freemen. *Raleigh.* 2. A townſman; a man of trade; not a gentleman.—

When he ſpeaks not like a *citizen*,
You find him like a ſoldier. *Shakeſpeare.*

3. An inhabitant; a dweller in any place.—

Far from noiſy Rome, ſecure, he lives;
And one more *citizen* to Sibyl gives. *Dryden.*

(2.) *A* CITIZEN of ancient Rome was diſtinguiſhed from a ſtranger, becauſe the latter belonged to no certain commonwealth ſubject to the Romans. A citizen was either by birth or election; and ſons might derive the right from their fathers. To make a good Roman citizen, it was neceſſary to be an inhabitant of Rome, to be inrolled in one of the tribes, and to be capable of dignities. Thoſe to whom were granted the rights and privileges of Roman citizens, were only honorary citizens. It was not lawful to ſcourge a citizen of Rome.

(3.) * CITIZEN. *adj.* [This is only in *Shakeſpeare.*] Having the qualities of a citizen; as cowardice, meanneſs.

So ſick I am not, yet I am not well;
But not ſo *citizen* a wanton, as
To ſeem to die ere ſick. *Shakeſpeare.*

(4.) CITIZEN, in the modern extenſive ſenſe of the word, (which with many other ſurpriſing changes, has originated from the French revolution,) is applied to every perſon within a ſtate, who is a native of it, or intitled to its privileges. In this ſenſe, it is nearly ſynonimous with *fellow countryman*. It is uſed variouſly both as a *ſubſtantive* and *adjective*. As a ſubſtantive, it has not only ſupplanted the uſe of the word *maſter*, (which, as implying a certain degree of ſuperiority, was thought inconſiſtent with democratic *equality*, though formerly the French were ſo fond of it, that in their ſuperſcriptions of letters they doubled it,—*Monſieur, Monſieur*,) but it has even aboliſhed the uſe of the vocative *Sir*, and every word analogous to it, all French letters now beginning with *citizen*.

CITIZENNESS, [*citoyenne*, Fr.] *n.ſ.* A word of modern uſe, if not invention, applied by the French to the female ſex in the extenſive ſenſe explained under CITIZEN, § 4.

CITIZENSHIP, *n.ſ.* The privilege of a citizen.

CITOW, a town of Bohemia, in the circle of Schlan, 10 miles SE. of Radnitz.

CITRARO, a town of Naples, in the province of Calabria Citerior, near the coaſt of the Tuſcan ſea, 18 miles W. of Biſignano.

(1.) * CITRINE. *adj.* [*citrinus*, Lat.] Lemon coloured; of a dark yellow.—The butterfly, papilio major, has its wings painted with *citrine* and black, both in long ſtreaks and ſpots. *Grew.*—By *citrine* urine of a thicker conſiſtence, the ſaltneſs of phlegm is known. *Floyer.*

(2.) * CITRINE. *n.ſ.* [from *citrinus*, Latin.] A ſpecies of cryſtal of an extremely pure, clear, and fine texture, generally free from flaws and blemiſhes. It is ever found in a long and ſlender column, irregularly hexangular, and terminated by an hexangular pyramid. It is from one to 4 or 5 inches in length. This ſtone is very plentiful in the Weſt Indies. Our jewellers have learned to call it *citrine*; and cut ſtones for rings out of it, which are miſtaken for topazes. *Hill.*

(1.) * CITRON-TREE. *n.ſ.* [from *citrus*, Lat.] It hath broad ſtiff leaves, like thoſe of the laurel. The flowers conſiſt of many leaves, expanded like a roſe. The piſtil becomes an oblong, thick, fleſhy fruit, very full of juice. Genoa is the great nurſery or theſe trees. One ſort, with a pointed fruit is in ſo great eſteem, that the ſingle fruits are ſold at Florence for two ſhillings each. *Miller.*

May the ſun
With *citron* groves adorn a diſtant ſoil. *Addiſon.*

(2.) CITRON TREE, in botany. See CITRUS.

CITRINUS, in natural hiſtory, a peculiar ſpecies of ſprig cryſtal, which is of a beautiful yellow. See CITRINE, N° 2. Many of the common cryſtals, when in the neighbourhood of lead mines, are liable to be accidentally tinged yellow, by an admixture of the particles of that metal; and all theſe, whether finer or coarſer, have been too frequently confounded together under the name CITRINE: but Dr Hill has aſcertained this to be a peculiar ſpecies of cryſtal different from all the others in form as well as in colour; and diſtinguiſhed by the name of *ellipomacroſtylum lucidum flaveſcens, pyramide brevi*. It is never found colourleſs like the other cryſtals, but has great variety of tinges, from that of the deeper ochres to a pale lemon colour. It is ſometimes found in Bohemia. The pyramid of this cryſtal is always finer than the column.

(3.) * CITRON-WATER. *n.ſ.* Aqua vitæ, diſtilled with the rind of citrons —

Like *citron waters* matrons cheeks inflame. *Pope.*

(4.) CITRON WATER may be thus made: take of fine thin lemon-peel, 18 ounces; of orange-peel, 9 ounces; perfect nutmegs, 3 ounces; the fineſt and beſt rectified ſpirit of wine, 2 gallons and a half. Digeſt in balneo mariæ for one night: draw off with a ſlow fire; then add as much water as will juſt make the matter milky (which will be about 7 quarts or 2 gallons;) and, laſtly, add 2 pounds of fine ſugar. This compoſition may be improved by freſh elder flowers, hung in a cloth in the head of the ſtill, ſprinkled with ambergreaſe in powder, or its eſſence.

(5.) CITRON WOOD, the wood of an American tree, called by the natives *candle wood*; becauſe, being cut into ſplinters, it burns like a candle. The tree is frequent in the Leeward Iſlands, and grows to a conſiderable ſize: the leaves are like thoſe of the bay tree, but of a finer green; the flower is ſweet, and much like thoſe of the orange; the fruit ſucceeding theſe is black, and of the ſize of a pepper corn. The trunk is ſo like the yellow ſaunders in colour, that there was once an opinion that it was the ſame tree, and much of it was imported into Europe, and ſold as ſuch: but they were ſoon found to be different; the ſaunders being of a ſweet ſcent, and moderately heavy and reſinous; the citron wood conſiderably heavy, very oily, and of a ſtrong ſmell It is of no known uſe in medicine; but is uſed in France and Germany by the turners, being a fine firm-grained wood, and taking a fine poliſh, and with age becoming of a very beautiful brown.

* CITRUL. *n.ſ.* the ſame with *pumpion*, ſo named from its yellow colour.

(I.) CITRUS, the CITRON-TREE: A genus of the polyadelphia order, belonging to the icoſandria claſs of plants. The calyx is quinquefid; the petals oblong, and five in number; the antheræ 20, with their filaments grown together ſo as to form various pencils. The fruit is an unilocular berry. There are 4 ſpecies; viz.

1. CITRUS AURANTIUM, the ORANGE TREE, hath an upright trunk dividing upward into a branchy, regular head, from 5 to 10 or 12 feet high; oval, ſpear-ſhaped, entire leaves, having winged foot-ſtalks and numerous white flowers at the ſides of the branches, ſucceeded by globular fruit compreſſed at both ends. The moſt noted varieties are, 1. The SEVILLE ORANGE. This is a very handſome tree, and the hardieſt of any; as in this country it ſhoots freely, produces large and beautiful leaves, flowers ſtronger, &c. The fruit is large, rough, rinded, and ſour, of excellent quality for economical uſes. 2. The CHINA ORANGE. This tree has moderately ſized leaves, and a ſmooth, thin rinded ſweet fruit, of which there are ſeveral varieties in warm countries, where they grow in the open ground. 3. The great *Shaddock*

dock orange, or *pumplemoes*, grows larger and ſtronger than the foregoing, with large, thick, and ſomewhat ſerrated leaves, and very large fruit, having a reddiſh pulp. It derives the name of Shaddock from one of that name that firſt brought it from the Eaſt Indies. 4. The FORBIDDEN-FRUIT TREE, in trunk, leaves, and flowers, very much reſembles the common orange tree; but the fruit, when ripe, is larger and longer than the biggeſt orange. See *Plate* LXXVI, *fig.* 6.—It has ſomewhat the taſte of ſhaddock; but far exceeds that, as well as the beſt orange, in its delicious taſte and flavour. 5. The *Horned orange* is a tree of moderate ſize, producing fruit which divide, and the rind runs out into diviſions like horns. 6. The *Hermaphrodite orange* is a common ſized tree, producing fruit ſhaped partly like an orange and partly like a citron. 7. The *Dwarf orange* tree, or nutmeg orange has a long ſtem and ſmall buſhy head, growing two or three feet high; ſmall oval leaves in cluſters; and numerous flowers in cluſters, covering the branches, ſucceeded by very ſmall fruit.

2. CITRUS LIMA, the LEMON TREE, hath an upright ſmooth trunk, divided upward into a branchy regular head; from 12 to 15 feet high; large, oval, ſpear-ſhaped, pointed, ſlightly ſawed leaves, on linear footſtalks: and many flowers from the ſides of the branches ſucceeded by large oval fruit prominent at the top. The varieties are, 1. the lemon-tree with ſour fruit; 2. with ſweetiſh fruit; 3. with very large fruit, called *Imperial lemon;* 4. with pear-ſhaped fruit; 5. with furrowed fruit; 6. with cluſtered fruit; 7. with childing fruit; 8. with whitiſh fruit; 9. with tricolor ſtriped fruit; 10. with ſilver ſtriped leaves; and 11. with double flowers.

3. CITRUS MEDICA, the CITRON TREE, hath an upright ſmooth trunk, divided at top into a branchy ſtrong-ſhooting, full head, from about 5 to 15 feet high, adorned with large oval, ſpear-ſhaped, thick leaves, having linear footſtalks, and numerous flowers from the ſides of the branches, ſucceeded by very large oblong oval, pointed, rough-rinded fruit. The varieties are, 1. citron tree with ſour fruit; 2. with ſweet fruit; 3. with long fruit; 4. with warted fruit; 5. with recurved fruit; and 6. with blotched leaves. Theſe are the moſt remarkable varieties of the three foregoing ſpecies of citrus: but beſides theſe there are a great number of others; and indeed in thoſe countries where they grow naturally, the varieties may be multiplied without end, like thoſe of our apples and pears. The flowers of all the ſpecies and varieties are formed each of five ſpreading petals, appearing here principally in May and June; and the fruit continue ſetting in June and July, and ripen the year following.

4. CITRUS TRIFOLIATA, the JAPONESE CITRON, is a thorny ſhrub growing naturally in Japan, where it is likewiſe known by the names of Gees and Karatals banna. The trunk, we are told by Kæmpfer, acquires by age and culture the thickneſs of a tree. The branches and ſhoots are unequal; in ſome parts compreſſed, in others ſwelling, eſpecially about the ſpines. Theſe proceed ſingly from the ſtem and branches; are ſtraight, run out from a broad baſe into a very ſharp point; and are protruded from the wood, with the common bark of which they are likewiſe inveſted. The wood is looſe and ſoft; the bark of a ſhining green, moiſt, and eaſily parting from the wood. The leaves are few in number, ſawed on the edges, veined, placed without order, but generally growing under the ſpines. They grow by threes, like thoſe of trefoil, upon the extremity of a common foot-ſtalk which is furniſhed on each ſide with a membranaceous fringe or margin, ſomewhat reſembling the pedicles of the orange. The upper ſurface of the leaves is of a bright lucid green, the lower dark and herbaceous. The flowers, which reſemble thoſe of the medlar, proceed ſingly from the arm-pits of the leaves, are white, poſſeſſed of no great degree of fragrance, and conſiſt of 5 petals. The fruit is equally beautiful with a middle ſized orange; their internal ſtructure is alſo pretty much the ſame: only the pulp is glutinous, of an unpleaſant ſmell, and a harſh diſagreeable taſte. The ſeeds have the ſame taſte with the pulp, and are ſhaped exactly like thoſe of the orange.

(II.) CITRUS, CULTURE OF THE DIFFERENT SPECIES OF. The 3 firſt ſpecies merit particular attention. They are elegant evergreens, riſing in this country from about 5 to 10 feet in height; forming full and handſome heads, cloſely garniſhed with beautiful large leaves all the year round, and putting forth a profuſion of ſweet flowers in ſpring and early in ſummer; which even in this climate are often ſucceeded by abundance of fruit that often arrive at tolerable perfection. Though all the varieties were originally obtained by ſeed, yet the only certain method of continuing the approved varieties is by budding or marching them on ſtocks raiſed from ſeed to a proper ſize. As the young trees, however, are brought in plenty from abroad, this method is ſeldom practiſed in this country: but for curioſity, it may be done by thoſe who are ſo inclined, in the following manner: Early in ſpring procure ſome kernels, which may be had in plenty from rotten fruits, or others that are properly ripened, obſerving that for ſtocks, the citron, lemon, and Seville orange, as being the freeſt ſhooters, are to be preferred; and of theſe the citrons is the ſtrongeſt. Sow the kernels in March, in pots of rich light earth half an inch deep, and plunge them in a hot-bed under frames and glaſſes. Dung or tan may be uſed, but the latter is preferable, giving air, and frequent ſprinklings of water. In 2 or 3 weeks, the plants will come up; and in 6 or 8 weeks more, they will be advanced 4 or 5 inches or more in height. They muſt now get more air and water; and about the middle of June harden them to the full air, in which let them remain till October; then move them into the green houſe, to ſtand till the ſpring, and in March or April plant them ſingly in ſmall pots; being careful to ſhake them out of the ſeedpots with their roots entire. They muſt be watered immediately after planting, and the watering muſt be occaſionally repeated. After this they are to be treated as woody exotics of the green-houſe; and in a year or two the largeſt of thoſe deſigned for ſtocks will be fit for budding. The operation for budding is performed in the month of Auguſt, and is done in the common way.

(ſee INOCULATION,) only the buds muſt be taken from trees of a good kind that bear well. As ſoon as the operation is finiſhed, the pots with their plants muſt be placed in the green-houſe, or in a glaſs caſe; or where there is the convenience of a ſpare bark pit, where the heat of the bark is almoſt exhauſted, the pots may be plunged therein for 2 or three weeks. In either caſe, however, the air muſt be admitted freely by opening the front glaſſes; allowing alſo a ſlight ſhade of mats in the middle of hot ſunſhine days, and ſupplying them with water every two or three days during this kind of weather. In 3 or 4 weeks the buds will be united with the ſtock; when it will be proper to looſen the bandages, that they may have room to ſwell; the buds, however, will all remain dormant till the next ſpring. They may alſo be propagated by inarching, which is done in the common way; (See INARCHING,) but the method of budding is found to produce much handſomer trees, and therefore is to be preferred. But the moſt cheap and expeditious method of procuring a collection of theſe kinds of trees is by having recourſe to ſuch as are imported from Spain, Italy, and Portugal. Theſe come over in cheſts, without any earth to their roots, having their roots and heads a little trimmed: they are commonly from 1 to 2 or 3 inches in diameter in the ſtem; from 2 to 4 or 5 feet in height: and by the aſſiſtance of a bark-bed they readily take root and grow freely; forming as good trees in two years, as could be raiſed here by inarching or budding in 15 or 20. They are ſold in the Italian ware-houſes in London. Their price is from 3s. to 21s. each, according to their ſize; and they are generally advertiſed as ſoon as they arrive, which is early in the ſpring, and the ſooner the better. In the choice of theſe trees, it muſt be obſerved, that they are commonly budded at ſuch height in the ſtem, as to form heads from about 2 to 4 or 5 feet high; and as they are frequently furniſhed with two buds, one on each ſide of the ſtem, theſe ſhould be choſen preferable to others; as they will form the moſt regular heads. Preparatory to their planting, they muſt be placed for a day or two in tubs of water to plump their bark and roots; after this they muſt be waſhed and cleaned, their branches trimmed to half a foot long, and the roots freed from diſeaſed parts, and all the ſmall dried fibres. Then they are to be planted in pots filled with light rich earth; and plunged in a tan-bed, where they are to remain for 3 or 4 months; after which they muſt be trained to the open air, but will not bear it longer than from the end of May till the middle or end of October. Sometimes theſe trees, inſtead of being kept in pots or tubs, are planted in the full ground; and where this can be done, it is by far the moſt eligible method. Where this is intended, there muſt be frames erected for the ſupport of glaſs and other covers, to defend the plants during inclement weather; and in this ſituation the trees generally ſhoot ſtrong, produce large fruit, and may be trained either as wall or ſtandard trees. A ſouth wall, in a dry ſituation, is proper for training them as wall-trees; againſt which may be erected wooden frame-work ſloping, either fixed or moveable, for the ſupport of glaſs frames for winter. For the greater protection of the trees in ſevere froſts, there may be a fire-place with a flue or two carried alongſt a low wall in the fronts and ends. To have the trees as ſtandards, a more capacious and lofty glaſs-caſe ſhould be erected againſt the wall, in the manner of a hot-houſe, but higher; in this one or two rows of orange trees may be planted, ſuffering them to run up as ſtandards with only ſome neceſſary pruning juſt to preſerve their regularity. In ſome places there are lofty moveable glaſs-caſes, ſo that two or three rows of trees are planted in a conſpicuous part of the pleaſure-ground. In winter the frame is put over them, and in ſummer wholly taken away; ſo that they appear like a little orange grove growing in the open ground. The flowering and fruit-ſetting ſeaſon of all the ſorts of citrus is in June and July. They are often, eſpecially the orange trees, greatly loaded with bloſſoms; and when theſe ſtand very thick, it is proper to thin them a little, taking off the ſmalleſt. As the trees continue blowing and ſetting their fruit for 3 months; when a full crop of fruit is ſet, it is of benefit to the trees and fruit to gather off the ſuperabundant bloſſoms as they are produced; though ſome permit them to remain on account of their appearance.

(III.) CITRUS, USES OF THE VARIOUS KINDS OF. The fruits of the citron, lemon, and orange trees, yield very agreeable acid juices; which, beſides the uſes to which they are commonly applied, anſwer conſiderable purpoſes in medicine. When Commodore Anſon ſailed round the world, his men were ſo ſurpriſingly recovered from the ſcurvy by the oranges which they found at the iſland of Tinian, that it was afterwards thought worthy of the attention of government to inquire into the virtues of theſe fruits as an antiſcorbutic medicine. In Captain Cook's laſt voyage, he was ſupplied with a quantity of orange and lemon juice inſpiſſated to a rob; but his opinion of its efficacy is by no means great. The dearneſs of it is a great objection; and unleſs in conjunction with other things, he has not obſerved its good effects. Sir John Pringle, in his diſcourſe before the Royal Society, when Captain Cook was preſented with a medal by that reſpectable body, differs a little from the Captain's opinion, and thinks that in the ſea-ſcurvy theſe fruits muſt neceſſarily be very efficacious. He approves, however, more of the juices themſelves depurated, than the extract of them; as this cannot be prepared without diſſipating many of the finer parts. The juice of lemons is very frequently uſed for neutraliſing alkaline ſalts for ſaline draughts. The citron is ſeldom uſed in this country; though its peel, as well as that of lemon, is candied and ſold as a ſweetmeat. The yellow peel of the lemon is an agreeable aromatic, as is alſo that of the orange; and in cold phlegmatic conſtitutions they prove excellent ſtomachics and carminatives, promoting appetite, warming the habit, and ſtrengthening the tone of the viſcera. Orange peel, however, is very conſiderably warmer than that of lemons; and abounds more in eſſential oil: to this circumſtance, therefore, due regard ought to be had in the uſe of theſe medicines. The flavour of orange peel is likewiſe leſs periſhable than that of lemons.

Both are ingredients in many officinal preparations. The young fruit of the Seville orange dried are uſed in medicine under the name of *aurantia curaſlaventia*. They are moderately warm bitteriſh aromatics, of a ſufficiently agreeable flavour. The flowers of the orange tree have been for ſome time paſt in great eſteem as a perfume. They are highly odoriferous, of a ſomewhat warm and bitter taſte. They yield their flavour by infuſion to rectified ſpirit, and in diſtillation both to ſpirit and water. The bitter matter is diſſolved in water, and, on evaporating the decoction, remains entire in the extract. The diſtilled water was formerly kept in the ſhops, but on account of the great ſcarcity of the flowers is now laid aſide; it is called by foreign writers *aqua naphæ*. An oil diſtilled from theſe flowers is brought from Italy under the name of *oleum*, or *eſſentia neroli*.

(1.) **CITTA CASTELLANA**, a town of Italy, late in the ſtate of the church, and patrimony of St Peter, afterwards in the Roman republic, and department of Cimino, once the ſee of a biſhop, united with Orta. It is 23 miles N. of Rome. Near this town the French, under gen. M'Donald, were attacked in their encampments, (Dec. 12, 1798,) by the Neapolitans, who ſurrounded them on all ſides, but were repulſed and completely routed, with the loſs of 2400 men, 3000 muſkets, their military cheſt, and whole baggage.

(2.) **CITTA DEL SOLE**, a town of Italy, in Tuſcany, built in 1565, by Coſmo I, duke of Tuſcany; 16 miles SSW. of Ravenna.

(3.) **CITTA DI CASTELLO**, a town of Italy, late in the ſtate of the church, and province of Umbria, afterwards in the Roman republic and department of Metauro, the ſee of a biſhop immediately under the Pope. It contains 10 churches, and a great number of convents. It is ſituated on the Tiber, 27 miles SW. of Urbino, and 97 N. of Rome. Lon. 12. 18. E. Lat. 43. 32. N.

(4.) **CITTA DUCALE**, a town of Naples, in the province of Abruzzo Ulterior, and late republican department of Metauro, founded in 1308, by Robert, duke of Calabria, and nearly deſtroyed, in 1703, by an earthquake. It is a biſhop's ſee, and lies 18 miles W. of Aquila.

(5.) **CITTA NUOVA**, a town of Italy, in the late Roman republic, and department of Racina, the ci-devant marquiſate of Ancona; containing 31 churches and convents. It is ſituated on the coaſt of the Adriatic 10 miles from Loretto. Lon. 13. 46. E. Lat. 43. 16. N.

(6.) **CITTA NUOVA**, a diſtrict of the late Maritime diviſion of Auſtria, in Iſtria, on the Quieto, comprehending three foreſts, one town, (N° 7.) and ſeveral villages.

(7.) **CITTA NUOVA**, an ancient town in the above diſtrict, ſituated on an iſthmus at the mouth of the Quieto, which forms a deep harbour for large ſhips. It has a cathedral and three churches, but is not populous. It lies 7 miles S. of Amage.

(8.) **CITTA NUOVA COTTONERA**, a fortified town of Malta, including the port of St Margarita.

(9.) **CITTA VITTORIOSA**, or **IL BORGO**, a ſtrong town in the iſland of Malta, ſeated on a narrow neck of land, in the harbour to the left of Valetta, from which, on each ſide of the town runs a canal, incloſing the town and forming a good harbour. It is defended by the caſtle of St Angelo on a high rock, joined to the town by a bridge. Lon. 14. 34. E. Lat. 35. 54. N.

CITTERN, a muſical inſtrument reſembling the guittar, for which it has been frequently miſtaken. Anciently it was called the CISTRUM, and till lately was held in great contempt both in France and Britain. The practice on it being extremely eaſy, it was formerly the amuſement of lewd women and their viſitors; inſomuch, that in many of the old Engliſh dramatic writers, it is made the ſymbol of a woman that lived by proſtitution.

CITTOWIANY, a town of Samogitia, 10 miles N. of Roſienne.

(1.) * **CITY**. *adj*. 1. Relating to the city.—

His enforcement of the *city* wives. *Shakeſp.*

He, I accuſe,

The *city* ports by this hath entered. *Shakeſp.*

2. Reſembling the manners of the citizens.—Make not a *city* feaſt of it, to let the meat cool ere we can agree upon the firſt cut. *Shakeſp.*

(2.) * **CITY**. *n. ſ.* [*cite*, French, *civitas*, Lat.] 1. A large collection of houſes and inhabitants.—Men ſeek ſafety from number better united, and from walls and fortifications; the uſe whereof is to make the few a match for the many, this is the original of *cities*. *Temple*.—*City*, in a ſtrict ſenſe, means the houſes incloſed within the walls: in a larger ſenſe, it reaches to all the ſuburbs. *Watts.* 2. [In the Engliſh law.] A town corporate, that hath a biſhop and a cathedral church. *Cowel.* 3. The inhabitants of a certain city, as diſtinguiſhed from other ſubjects.—

What is the *city* but the people?——

——True, the people are the *city*. *Shakeſp.*

I do ſuſpect I have done ſome offence,

That ſeems diſgracious in the *city*'s eye. *Shak.*

(3.) **CITY**, (§ 1. *def.* 2.) among the Romans was called *civitas oppidum*, and *urbs*: *civitas*, as being governed by a juſtice and order of magiſtracy; *oppidum*, as containing a great number of inhabitants; *urbs*, on account of its being ſurrounded with walls. According to Blount, *city* is a word that hath obtained in England only ſince the conqueſt; for, in the time of the Saxons, there were no cities, but all the great towns were called *burghs*; and even London was then called LONDON-BURGH, as the capital of Scotland is ſtill called EDINBURGH. And long after the conqueſt the word *city* was uſed promiſcuouſly with *burgh*, as in the charter of Leiceſter, where it is both called *civitas* and *burgus*; which ſhows that thoſe writers were miſtaken who tell us that every city was, or is, a biſhop's ſee. And though the word *city* ſignifies in England, ſuch a town corporate as hath uſually a biſhop and a cathedral church, yet theſe are by no means neceſſary requiſites to conſtitute a city. While the feudal policy prevailed, cities and villages held of ſome great lord on whom they depended for protection, and were under arbitrary juriſdiction. The inhabitants were deprived of the natural and moſt unalienable rights of humanity. They could not diſpoſe of the effects which their own induſtry had acquired, either by a latter will, or by any deed executed during their life. They had no right to appoint guardians for their children during their minority. They were not permitted to marry without purchaſing

chaſing the conſent of the lord on whom they depended. If once they had commenced a law-ſuit, they durſt not terminate it by an accommodation, becauſe that would have deprived the lord, in whoſe court they pleaded, of the perquiſites due to him on paſſing his ſentence. Services of various kinds, no leſs diſgraceful than oppreſſive, were exacted from them without mercy or moderation. The ſpirit of induſtry was checked in ſome cities by abſurd regulations, and in others by unreaſonable exactions: nor would the narrow and oppreſſive maxims of a military ariſtocracy have permitted it ever to riſe to any degree of height or vigour. The freedom of cities was firſt eſtabliſhed in Italy, owing principally to the introduction of commerce. As ſoon as they began to turn their attention towards this object, and to conceive ſome idea of the advantages they might derive from it, they became impatient to ſhake off the yoke of their inſolent lords, and to eſtabliſh among themſelves ſuch a free and equal government as would render property ſecure and induſtry flouriſhing. The German emperors, eſpecially thoſe of the Franconian and Suabian lines, as the ſeat of their government was far diſtant from Italy, poſſeſſed a feeble and imperfect juriſdiction in that country. Their perpetual quarrels, either with the popes or their own turbulent vaſſals, diverted their attention from the interior police of Italy, and gave conſtant employment for their arms. Theſe circumſtances induced ſome of the Italian cities, towards the beginning of the 11th century, to aſſume new privileges; to unite together more cloſely; and to form themſelves into bodies politic, under the government of laws eſtabliſhed by common conſent. The rights which many cities acquired by bold or fortunate uſurpations, others purchaſed from the emperors, who deemed themſelves gainers when they received large ſums for immunities which they were no longer able to with-hold; and ſome cities obtained them gratuitouſly from the facility or generoſity of the princes on whom they depended. The great increaſe of wealth which the cruſades brought into Italy, occaſioned a new kind of fermentation and activity in the minds of the people, and excited ſuch a general paſſion for liberty and independence, that, before the concluſion of the laſt cruſade, all the conſiderable cities in that country had either purchaſed or extorted large immunities from the emperors. This innovation ſoon made its way into France. Lewis the Groſs, in order to create ſome power that might counterbalance thoſe potent vaſſals, who controlled the crown, firſt adopted the plan of conferring new privileges on the towns ſituated within his own domaine. Theſe privileges were called *charters of community*, by which he enfranchiſed the inhabitants, aboliſhed all marks of ſervitude, and formed them into corporations or bodies politic, to be governed by a council and magiſtrates of their own nomination. Theſe magiſtrates had the right of adminiſtering juſtice within their own precincts; of levying taxes; of embodying and training to arms the militia of the town, which took the field when required by the ſovereign, under the command of officers appointed by the community. The great barons imitated the example of their monarch, and granted like immunities to the towns within their territories. They had waſted ſuch great ſums in their expeditions to the Holy Land, that they were eager to lay hold on this new expedient for raiſing money by the ſale of thoſe charters of liberty. Though the conſtitution of communities was as repugnant to their maxims of policy, as it was adverſe to their power, they diſregarded remote conſequences in order to obtain preſent relief. In leſs than two centuries, ſervitude was aboliſhed in moſt of the cities of France, and they became free corporations, inſtead of dependent villages without juriſdiction or privileges. Much about the ſame period the great cities of Germany began to acquire ſimilar immunities, and laid the foundations of their preſent independence. The practice ſpread quickly over Europe, and was adopted in Spain, England, Scotland, and all the other feudal kingdoms. The Spaniſh hiſtorians are almoſt entirely ſilent concerning the origin and progreſs of communities in that kingdom; ſo that it is impoſſible to fix with any degree of certainty the time and manner of their firſt introduction there. It appears, however, from Mariana, that in 1350, 18 cities had obtained a ſeat in the Cortes of Caſtile. In Arragon, cities ſeem early to have acquired extenſive immunities, together with a ſhare in the legiſlature. In 1118, the citizens of Saragoſſa had not only obtained political liberty, but they were declared to be of equal rank with the nobles of the ſecond claſs; and many other immunities, unknown to perſons in their rank of life, in other parts of Europe, were conferred upon them. In England, the eſtabliſhment of communities or corporations was poſterior to the conqueſt. The practice was borrowed from France, and the privileges granted by the crown were perfectly ſimilar to thoſe above enumerated. It is not improbable, that ſome of the towns of England were formed into corporations under the Saxon kings; and that the charters granted by the kings of the Norman race were not charters of enfranchiſement from a ſtate of ſlavery, but a confirmation of privileges which they had already enjoyed. The Engliſh cities, however, were very inconſiderable in the 12th century. A clear proof of this occurs in *Lord Lyttleton's Hiſtory of Henry II.* Vol. II. p. 317. Fitz-Stephen, a contemporary author, gives a deſcription of the city of London in the reign of Henry II. and the terms in which he ſpeaks of its trade, its wealth, and the number of its inhabitants, would ſuggeſt no inadequate idea of its ſtate at preſent, when it is the greateſt and moſt opulent city in Europe. But all ideas of grandeur and magnificence are merely comparative. It appears from Peter of Blois, archdeacon of London, who flouriſhed in the ſame reign, and who had good opportunity of being informed, that the city, of which Fitz-Stephen gives ſuch a pompous account, contained no more than 40,000 inhabitants. The other cities were ſmall in proportion, and in no condition to extort any extenſive privileges. That the conſtitution of the boroughs of Scotland in many circumſtances reſembled that of the towns of France and England, is manifeſt from the *Leges Burgorum* annexed to the *Regiam Majeſtatem*.

CIVEDA. See Civita, Nº 1.

(1.) * **CIVET.** *n. ſ.* [*civitte*, Fr. *zibetta*, Arabic, ſignifying *ſcent.*] A perfume from the civet cat.—The *civet*, or *civet cat*, is a little animal, not unlike our cat. It is a native of the Indies, Peru, Braſil, Guinea. The perfume is formed like a kind of greaſe, in a bag under its tail, between the anus and pudendum. It is gathered from time to time, and abounds in proportion as the animal is fed. *Trevoux.*—*Civet* is of baſer birth than tar; the very uncleanly flux of a cat. *Shakeſp.*—Some putrefaction and excrements do yield excellent odours; as *civet* and muſk, and, as ſome think, ambergreaſe. *Bacon's Natural Hiſtory.*

(2.) **Civet**, when good, is of a clear, yellowiſh, or browniſh colour; not fluid nor hard, but about the conſiſtence of butter or honey, and uniform throughout; of a very ſtrong ſmell, quite offenſive when undiluted, but agreeable when only a ſmall proportion of civet is mixed with a large one of other ſubſtances. It unites eaſily with oils both expreſſed and diſtilled, but not at all with water or ſpirit of wine: nor can it be rendered miſcible with water by the mediation of ſugar. The yolk of an egg ſeems to diſpoſe it to unite with water; but in a very little, the civet ſeparates from the liquor, and falls to the bottom, though it does not prove of ſuch a reſinous tenacity, as when treated with ſugar and ſpirit of wine. It communicates, however, ſome ſhare of its ſmell both to watery and ſpirituous liquors: hence a ſmall portion of it is often added in odoriferous tinctures, and ſuſpended in the ſtill-head during the diſtillation of odoriferous waters and ſpirits. It is rarely employed for medicinal purpoſes. The Italians make it an ingredient in perfumed oils, and thus obtain the whole of its ſcent; for oils wholly diſſolve the ſubſtance of it. It is very rare, however, to meet with it unadulterated. The ſubſtances uſually mixed with it are lard and butter; which agreeing with it in its general properties, render all criteria for diſtinguiſhing the adulteration uncertain. A great trade of civet is carried on at Calicut, Baſſora, and other parts of the Indies, and in Africa, where the civet cat is found. Live civet cats are to be ſeen alſo in France and Holland. The French keep them only as a rarity; but the Dutch, who keep a great number, draw the civet from them for ſale. It is moſtly uſed by confectioners and perfumers.

(3.) **Civet cat**, in zoology. See Viverra.

(1.) * **CIVICK.** *adj.* [*civicus*, Latin.] Relating to civil honours or practices; not military.—

> With equal rays immortal Tully ſhone:
> Behind, Rome's genius waits with *civick* crowns,
> And the great father of his country owns. *Pope.*

(2.) **Civick crown** was a crown given by the ancient Romans to any ſoldier who had ſaved the life of a citizen in an engagement. The civick crown was reckoned more honourable than any other crown, though compoſed of no better materials than oak boughs. Plutarch, in his life of Coriolanus, thus accounts for preferring the branches of this tree before all others: becauſe, ſays he, the oaken wreath being ſacred to Jupiter, the great guardian of their city, they thought it the moſt proper ornament for him who had preſerved the life of a citizen. Pliny, (*Lib.* XVI. cap. 4.) ſpeaking of the honour and privileges conferred on thoſe who had merited this crown, ſays, "They who had once obtained it, might wear it always." When they appeared at the public ſpectacles, the ſenate and people roſe to do them honour, and they took their ſeats on theſe occaſions among the ſenators. They were not only perſonally excuſed from all troubleſome offices, but procured the ſame immunity for their father and grandfather by the father's ſide.

CIVIDA, [Span. *i. e.* a city,] makes a part of the names of the following towns.

(1.) **Cividad de las Palmas**, the capital of the iſland of Canary, with a biſhop's ſee, and a good harbour. The houſes are well built, two ſtories high, and flat-roofed. The cathedral is very handſome, and the inhabitants are gay, rich, and numerous, amounting to about 12,000. The air is temperate, and free from extremes of heat and cold. It is defended by a ſmall caſtle ſeated on a hill. Lon. 14. 35. W. Lat. 28. 0. N.

(2.) **Cividad de los Reyes**, a town of S. America, in the country of Terra Firma, and province of St Martha. The heat is moderated in ſummer by the eaſt wind; but the frequent rains and chilling winds which come from the mountains produce coughs and fevers. The land is fertile, and abounds in paſtures. The natives are numerous, warlike, and as yet unſubdued.

(3.) **Cividad del Rey Felippe**, a town built in 1585, on the continent of S. America, near the ſtraits of Magellan, but ſoon abandoned.

(4.) **Cividad del Rio del St Pedro**, a town of S. America, in Braſil, ſituated at the mouth of the river St Pedro. Lon. 34. 15. W. of Greenwich. Lat. 32. 0. S.

(5.) **Cividad di Friuli**, a well-built town of the late maritime diviſion of Auſtria, in Friuli, anciently called *Forum Julii.* It contains 4000 inhabitants, and is ſituated at the foot of the mountains, on the river Natiſona, 10 miles E. of Udina. Lon. 13. 25. E, Lat. 46. 15. N.

(6.) **Cividad Real**, a town of Spain, in New Caſtile, and capital of La Mancha. The inhabitants are noted for dreſſing leather extremely well for gloves. Here are 3 churches, 7 convents, and 3 hoſpitals. It is 57 miles S. of Toledo, and 90 from Madrid. Lon. 3. 25. W. Lat. 35. 58 N.

(7.) **Cividad Rodrigo**, a ſtrong town of Spain, in the kingdom of Leon, with a biſhop's ſee, ſuffragan of Compoſtella, built by Ferdinand II. as a rampart againſt Portugal. It is ſeated in a fertile country, on the river Auada, 3 miles SSW. of Salamanca. Lon. 6. 52. W. Lat. 40. 38. N.

(1.) * **CIVIL.** *adj.* [*civilis*, Latin.] 1. Relating to the community; political; relating to the city or government.—God gave them laws of *civil* regimen, and would not permit their commonweal to be governed by any other laws than his own. *Hooker.*—

> Part ſuch as appertain
> To *civil* juſtice, part, religious rites
> Of ſacrifice. *Milt. Par. Loſt.*

—But there is another unity, which would be moſt advantageous to our country; and that is your endeavour after a *civil*, a political union in the whole nation. *Spratt.* 2. Relating to any man as a member of a community.—Break not your promiſe, unleſs it be unlawful or impoſſible; either out of your natural, or out of your *civil* power. *Taylor.* 3. Not in anarchy; not wild; not without rule or government.—

For rudeſt minds with harmony were caught,
And *civil* life was by the muſes taught. *Roſcom.*

4. Not foreign; inteſtine.—From a *civil* war, God of his mercy defend us as that which is moſt deſperate of all others. *Bacon to Villiers.* 5. Not eccleſiaſtical; as, the eccleſiaſtical courts are controlled by the *civil.* 6. Not natural; as, a perſon baniſhed or outlawed is ſaid to ſuffer *civil,* though not natural death. 7. Not military; as, the civil magiſtrate's authority is obſtructed by war. 8. Not criminal; as, this is a *civil* proceſs, not a criminal proſecution. 9 Civiliſed; not barbarous.—England was very rude and barbarous; for it is but even the other day ſince England grew *civil.* *Spenſer on Ireland.* 10. Complaiſant; civiliſed; gentle; well bred; elegant of manners; not rude; not brutal; not coarſe.—He was *civil* and well-natured, never refuſing to teach another. *Dryden.*—

And fall theſe ſayings from that gentle tongue,
Where *civil* ſpeech and ſoft perſuaſion hung? *Prior.*

11. Grave; ſober; not gay or ſhewy.—

This night oft ſee me in thy pale career,
'Till *civil* ſuited morn appear. *Milton.*

12. Relating to the ancient conſular or imperial government; as, *civil* law.—

No woman had it, but a *civil* doctor. *Shak.*

(2.) CIVIL, in a legal ſenſe, is alſo applied to the ordinary procedure in an action, relating to ſome pecuniary matter or intereſt; in which ſenſe it is oppoſed to criminal.

(3.) CIVIL DEATH, (§ 1. *def.* 6.) any thing that cuts off a man from civil ſociety; as a condemnation to the galleys, a perpetual baniſhment, and outlawry; as well as condemnation to death itſelf. Anciently *excommunication* had the ſame effect, but happily, the power of the clergy, which formerly made even kings and emperors tremble, is now nearly at an end.

(4.) CIVIL LAW, is properly the peculiar law of each ſtate, country, or city; but what we uſually mean by the civil law, is a body of laws compoſed out of the beſt Roman and Grecian laws, compiled from the laws of nature and nations; and, for the moſt part, received and obſerved throughout all the Roman dominions for above 1200 years. See LAW *Index.* It was firſt brought over into England by Theobald a Norman abbot, who was elected to the ſee of Canterbury in 1138; and he appointed a profeſſor, *viz.* Roger ſirnamed *Vicarius,* in the univerſity of Oxford, to teach it to the people of this country. Nevertheleſs, it gained ground very ſlowly. King Stephen iſſued a proclamation prohibiting the ſtudy of it. And though the clergy were attached to it, the laity rather wiſhed to preſerve the old conſtitution. However, the zeal and influence of the clergy prevailed; and the civil law acquired great reputation from the reign of King Stephen to the reign of King Edward III. both incluſive. Many tranſcripts of Juſtinian's Inſtitute are to be found in the writings of our ancient authors, particularly of Bracton and Fleta; and Judge Blackſtone obſerves, that the common law would have been loſt and over-run by the civil, had it not been for the incident of fixing the court of common pleas in one certain ſpot, and the forming the profeſſion of the municipal law into an aggregate body. It is allowed, that the civil law contains all the principles of natural equity; and that nothing can be better calculated to form good ſenſe and ſound judgment. Hence, though in ſeveral countries it has no other authority but that of reaſon and juſtice, it is every where referred to for authority. It is not received at this day in any nation without ſome alterations: ſometimes the feudal law is mixed with it, or general and particular cuſtoms; and often ordinances and ſtatutes cut off a great part of it. In Turky, the Baſilics are only uſed. In Italy, the canon law and cuſtoms have hitherto excluded a good part of it. In the ci-devant ſtate of Venice, cuſtom had almoſt an abſolute government. In the Milaneſe, the feudal law, aud particular cuſtoms, bore ſway. In Naples and Sicily, the conſtitutions and laws of the Lombards are ſaid to prevail. In Germany, the civil law is eſteemed to be the municipal law; but yet many parts of it are there grown obſolete; and others are altered, either by the canon law or a different uſage. In Friezeland, before the late revolution, it was obſerved with more ſtrictneſs; but in the northern parts of Germany, the jus Saxonicum, Lubecenſe, or Culmenſe, is preferred before it. In Denmark and Sweden, it hath ſcarce any authority at all. In France, before the late revolution, only a part of it was received, in ſome places as a cuſtomary law; and in thoſe provinces neareſt to Italy, it was received as a municipal written law. In criminal cauſes, the civil law was more regarded in France; but the manner of trial was regulated by ordinances and edicts. In Spain and Portugal, the civil law is connected with the jus regium and cuſtom. In Scotland, the ſtatutes of the ſederunt, part of the *Regiæ Majeſtatis,* and their cuſtoms, controul the civil law. In England, it is uſed in the eccleſiaſtical courts, in the high court of admiralty, in the court of chivalry, in the two univerſities, and in the courts of equity; yet in all theſe it is reſtrained and directed by the common law.

(5.) CIVIL SOCIETY. See LAW, *Index.*

(6.) CIVIL STATE, in the Britiſh polity, one of the general diviſions of the LAITY, comprehending all orders of men from the higheſt nobleman to the meaneſt peaſant that are not included under the MILITARY or MARITIME ſtates: though it may ſometimes include individuals of theſe as well as of the CLERGY; ſince a nobleman, a knight, a gentleman, or a peaſant, may become either a divine, a ſoldier, or a ſeaman. The diviſion of this ſtate is into NOBILITY and COMMONALTY. See theſe articles.

(7.) CIVIL WAR, a war between people of the ſame ſtate, or the citizens of the ſame city; one of the greateſt misfortunes that can befal a nation.

(8.) CIVIL YEAR, the legal year, or annual account of time, which every government appoints to be uſed within its own dominions. See ASTRONOMY, and CHRONOLOGY, *Indexes.*

* CIVILIAN. *n. ſ.* [*civilis,* Lat.] One that profeſſes the knowledge of the old Roman law, and

of general equity.—The profeſſors of that law, called *civilians*, becauſe the civil law is their guide, ſhould not be diſcountenanced nor diſcouraged. *Bacon.*—A depending kingdom is a term of art, unknown to all ancient *civilians*, and writers upon government. *Swift.*

* CIVILISATION. *n. ſ.* [from *civil.*] A law, act of juſtice, or judgment, which renders a criminal proceſs civil; which is performed by turning an information into an inqueſt, or the contrary. *Harris.*

(1.) * CIVILITY. *n. ſ.* [from *civil.*] 1. Freedom from barbarity; the ſtate of being civiliſed. —The Engliſh were at firſt as ſtout and warlike a people as ever the Iriſh; and yet are now brought unto that *civility*, that no nation excelleth them in all goodly converſation, and all the ſtudies of knowledge and humanity. *Spſe r.*—Divers great monarchies have riſen from barbariſm to *civility*, and fallen again to ruin. *Davies.* 2. Politeneſs; complaiſance; elegance of behaviour.—

Art thou thus bolden'd, man, by thy diſtreſs;
Or elſe a rude deſpiſer of good manners,
That in *civility* thou ſeem'ſt ſo empty? *Shakeſp.*

—He, by his great *civility* and affability, wrought very much upon the people. *Clarendon.* 3. Rule of decency; practice of politeneſs.—

Love taught him ſhame; and ſhame, with love at ſtrife,
Soon taught the ſweet *civilities* of life. *Dryden.*

(2.) CIVILITY, as defined (§ 1. *def.* 2, 3.) is juſtly inculcated as a duty of no ſlight conſideration. Without civility, or good-breeding, a court would be the ſeat of violence and deſolation. There, all the paſſions are in fermentation, becauſe all purſue what but few can obtain; there, if enemies did not embrace, they would ſtab; there, ſmiles are often put on to conceal tears; there, mutual ſervices are profeſſed, while mutual injuries are intended; and there, the guile of the ſerpent ſimulates the gentleneſs of the dove. To what a degree muſt good-breeding adorn the beauty of truth, when it can thus ſoften the deformity of falſehood? As we are placed in a world where natural evil abounds, we ought to render it ſupportable to each other as far as human endeavours can avail. All that can add a ſweet engredient to the bitter cup muſt be infuſed. Amid the multitude of thorns, every flower that will grow muſt be cultivated with care, but neither pomp nor power are of themſelves able to alieviate the load of life. The heart requires to be ſoothed by ſympathy. A thouſand little attentions from all around us are neceſſary to render our days agreeable. The appearance of neglect in any of thoſe with whom we are connected, chills our boſom with chagrin, or kindles the fire of reſentment. Nothing thereform ſeems ſo likely to enſure happineſs as our mutual endeavours to promote it. Our ſingle endeavours, orginating and terminating in ourſelves, are uſually unſucceſsful. Providence has taken care to ſecure that intercourſe which is neceſſary to the exiſtence of ſociety, by rendering it the greateſt ſweetener of human life. By reciprocal attentions we are enabled to become beneficent without expenſe. A ſmile, an affable addreſs, a look of approbation, are often capable of giving a greater pleaſure than pecuniary benefits can beſtow. The mere participation of the ſtudies and amuſements of others, at the ſame time that it gratifies ourſelves, is often an act of real humanity; becauſe others would not enjoy them without companions. A friendly viſit in a ſolitary hour, is often a greater act of kindneſs than a valuable preſent. It is really matter of ſurpriſe, that thoſe who are diſtinguiſhed by rank and opulence ſhould ever be unpopular in their neighbourhood. They muſt know the value of popularity; and ſurely nothing is more eaſily obtained by a ſuperior. Their notice confers honour; and the aſpiring heart of man is always delighted with diſtinction. A gracious look from them diffuſes happineſs on the lower ranks. But it uſually happens, that an overgrown rich man is not the favourite of a neighbouring country; and it is unfortunate, that pride or inadvertance often prevent men from acting that god-like part of making others happy, even when they might do it without inconvenience to themſelves.

To CIVILIZE. *v. a.* [from *civil.*] To reclaim from ſavageneſs and brutality; to inſtruct in the arts of regular life.—

We ſend the graces and the muſes forth,
To *civilize* and to inſtruct the North. *Waller.*

—Amongſt thoſe who are counted the *civilized* part of mankind, this original law of nature ſtill takes place. *Locke.*—Oſiris, or Bacchus, is reported to have *civilized* the Indians, and reigned amongſt them fifty two years. *Arbuthnot.*

* CIVILIZER. *n. ſ.* [from *civilize.*] He that reclaims others from a wild and ſavage life; he that teaches the rules and cuſtoms of civility.—

The *civilizers*!—the diſturbers, ſay;—
The robbers, the corruptors of mankind!
Philip's Britain.

* CIVILLY. *adv.* [from *civil.*] 1. In a manner relating to government, or to the rights or character of a member of a community; not naturally. —Men that are civil lead their lives after one common law; for that a multitude ſhould, without harmony, concur in the doing of one thing: for this is *civilly* to live; or ſhould manage community of life, it is not poſſible. *Hooker.* 2. Not criminally.—That accuſation, which is publick, is either *civilly* commenced for the private ſatisfaction of the party injured: or elſe crimminally, that is, for ſome publick puniſhment. *Ayliffe.* 3. Politely; complaiſantly; gently; without rudneſs; without brutality.—I will deal *civilly* with his poems: nothing ill is to be ſpoken of the dead. *Dryden.*—I would have had Almeria and Oſmyn parted *civilly* as if it was not proper for lovers to do ſo. *Collier.*—

He thought them folks that loſt their way,
And aſk'd them *civilly* to ſtay. *Prior.*

4. Without gay or gaudy colours.—The chambers were handſome and cheerful, and furniſhed *civilly*. *Bacon.*

CIVISM, *n. ſ.* a word lately introduced from the French, literally ſignifying a ſtrict adherence to the duties of a *citizen*; but like that word, (ſee CITIZEN, § 4,) it is uſed by the French in an extenſive ſenſe, to comprehend all the duties and virtues of PATRIOTISM.

(1.) CIVITA, [Ital. *i. e.* a city,] or CIVEDA, a town of Italy, in the department of Oglio, and ci-de-ci-devant province of Breſciano; ſeated on the Oglio, 25 miles W. of Breſcia.

(2.) Civita Aquana, a town of Naples, in the province of Abruzzo Ulterior, 15 miles E. from Aquila.

(3.) Civita Borello, a town of Naples, in Abruzzo Citra, and late dep. of the Sangro 19 miles NNE. of Moleſe.

(4.) Civita Castellana. See Citta, N° 1.

(5.) Civita d'Antina, a town of Naples, in the province of Abruzzo Ultra, and late dep. of Peſcara, 12 miles S. from Celano.

(6.) Civita di Cascia, a town of Italy, late in the ſtate of the Church, and province of Umbria, afterwards in the department Clitumno, 5 miles SW. of Norcia.

(7.) Civita di Chieti, or Teti, a city of Naples, anciently called Theati, capital of the province of Abruzzo Citra, and in the late dep. of Peſcara. It is the ſee of an archbiſhop, and contains 4 churches and 9 convents, ſituated near the Peſcara, 7 miles N. of Capua, and 93 N. of Naples. Lon. 32. 28. E. of Ferro. Lat. 42. 47. N.

(8.) Civita di Penna, an ancient town of Naples, in Abruzzo Ulterior, and department of Peſcara with a biſhop's ſee. It is ſituated near the river Salino, 25 miles NE. of Aquila. Lon. 14. 52. E. Lat. 42. 25. N.

(9.) Civita di St Angelo, a town of Naples, in the province of Abruzzo Ultra, and deparment of Peſcara, ſituated on a mountain, 3 miles from Poto di Salino.

(10.) Civita Lavinia, a town of Italy, in the Campagna di Roma, and department of Circeo, 4 miles from Veletri.

(11.) Civita Luparella, a town of Naples, in the province of Abruzzo Citra and department of Sangro, 2 miles N. of Civita Borello.

(12.) Civita Mandonia, a town of Naples, of Biſignano.

(13.) Civita Mare, a town of Naples, in the province of Capitanata, 13 miles ESE. of Termola.

(14.) Civita Nuova, a town of Italy, in Ancona, 7 miles from Loretto and 9 from Fermo.

(15.) Civita Real, a town of Naples, in the province of Abruzzo Ultra, and department of Peſcara, 13 miles NW. of Aquila.

(16.) Civita Tomassa, a town of Naples, in the province of Abruzzo Ultra, and department of Peſcara, 6 miles SW. of Aquila.

(17.) Civita Turchino, a place in Italy, about 2 miles N. of Corneto, in the pope's territories. It is an hill of an oblong form, the ſummit of which is almoſt one continued plain. From the quantity of medals, intaglios, fragments of inſcriptions, &c. occaſionally found here, it is believed to be the very ſpot where the ancient city of Tarquinii ſtood. At preſent it is only one continued field of corn. On the SE. ſide of it runs the ridge of a hill which unites it to Corneto. This ridge is at leaſt 3 or 4 miles in length, and almoſt entirely covered with artificial hillocks called by the inhabitants *monti roſſi*. About 12 of theſe hillocks have been opened; and in each of them have been found ſeveral ſubterranean apartments cut out of the ſolid rock. Theſe are of various forms and dimenſions; ſome conſiſt of a large outer room, and a ſmall one within; others of a ſmall room at the entrance, and a large one within: others are ſupported by a column of the ſolid rock left in the centre, with openings on every part. The entrance to them all is by a door about 5 feet high, by 2½ broad. Some have no light but from the door, while others ſeem to have had a ſmall light from above, through a hole of a pyramidal form. Many of theſe apartments have an elevated port that runs all round the wall, being a part of the rock left for that purpoſe. The moveables found in theſe apartments conſiſt chiefly of Eruſcan vaſes of various forms: but in ſome have been found plain ſacrophagi of ſtone, with bones in them. Moſt of theſe apartments are ſtuccoed, and ornamented; ſome are plain but three are richly adorned, having a double row of Etruſcan inſcriptions running round the upper part of the walls, and under them a kind of frieze of figures in painting: ſome have an ornament under the figures, which ſeems to ſupply the place of an architrave. The paintings ſeem to be in freſco; and in general reſemble thoſe which are uſually ſeen upon Etruſcan vaſes; though ſome of them are perhaps ſuperior to any thing yet ſeen of the Etruſcan art in painting. In general they are ſlight, but well conceived; and prove, that the artiſt was capable of producing things more ſtudied and better finiſhed; though, in ſuch a ſubterraneous ſituation, the delicacy of a finiſhed work would in a great meaſure have been thrown away. It is probable, however, that among the immenſe number of theſe apartments that yet remain to be opened, many paintings and inſcriptions may be found ſufficient to form a very uſeful and entertaining work. At preſent this great ſcene of antiquities is little known, even in Rome. Mr Jenkins, reſident at Rome, was the firſt Engliſhman who viſited it.

(18.) Civita Vecchia, a ſea port town of Italy, in the Pope's territories, with a good harbour and an arſenal. Here the Pope's galleys are ſtationed, and it has lately been made a free port; but the air is very unwholeſome. It is 35 miles NW. of Rome. Lon. 11. 51. E. Lat. 42. 5. N.

(19.) Civita Vecchia. See Malta, N° 2.

CIVITARA, a town of Naples, in the Capitanata, 2 miles NE. of Dragonera.

(1.) CIVITELLA, a fortreſs of Naples, in Abruzzo Ulterior, 7 miles N. of Teramo.

(2.) Civitella, a town of Naples, in the Otranto, 5 miles NE. of Tarento.

(1.) CIVOLI, or Cigoli, a town in Tuſcany, with a caſtle, the birth place of Cardi.

(2.) Civoli, or Cigoli, Lewis. See Cardi.

CIVRAC, a town of France, in the department of Gironde, 7 miles E. of Libourne.

CIVRAY. See Sivray.

CIVRY, a town of France, in the department of the Eure and Loire, and chief place of a canton, in the diſtrict of Chateau-dun, 7 miles ENE. of Chateau-dun.

(1.) CIUS, in ancient geography, a river of Bithynia, which gave name to the Cianus Sinus. Hylas, the favourite boy of Hercules, is ſaid to have been drowned in it.

(2.) Cius, in ancient geography, a town of Bithynia,

thynia, which was afterwards called *Pruſia*, having been deſtroyed by Philip the father of Perſeus, and rebuilt by Pruſias king of Bithynia.

(1.) CIZE, a valley of France, in the department of the Lower Pyrenees, and ci-devant province of Navarre.

(2.) * Cize. *n. ſ.* [perhaps from *inciſa*, Latin, ſhaped or cut to a certain magnitude.] The quantity of any thing, with regard to its external form; often written *ſize*.—If no motion can alter bodies, that is, reduce them to ſome other *cize* or figure, then there is none of itſelf to give them the *cize* and figure which they have. *Grew.*

CKEBOE, a town of Norway, 6 miles SSE. of Drontheim.

CLABY, a town of Ireland, in Fermanagh, Ulſter.

CLACHAN, [Gael. *i. e.* a ſmall village, or kirktown,] a village of Scotland, in the pariſh of Campſie, Stirlingſhire.

Clachan-Dysart. See Glenorchay.

CLACHLAND, a ſmall iſland of Scotland, near the eaſt coaſt of the iſland of Arran.

(1.) * CLACK. *n. ſ.* [*klatchen*, Germ. to rattle; to make a noiſe.] 1. Any thing that makes a laſting and importunate noiſe; generally uſed, in contempt, for the tongue.—

Fancy flows in, and muſe flies high;
He knows not when my *clack* will lie. *Prior.*

2. *The* Clack *of a Mill.* A bell that rings when more corn requires to be put in.—

Says John, juſt at the hopper will I ſtand,
And mark the *clack* how juſtly it will ſound.
Betterton.

(2, 3.) Clack, in geography, two Engliſh villages; viz. 1. in Devonſhire, 7 miles from Frome: 2. in Wilts, near Chriſtian-Malford.

(1.) * *To* Clack. *v. a.* As to *clack wool*, is to cut off the ſheep's mark, which makes it to weigh leſs, and ſo yield the leſs cuſtom to the king. *Cowel.*

(2.) * *To* Clack. *v. n.* [from the noun.] 1. To make a chinking noiſe. 2. To let the tongue run.

(1.) CLACKMANNAN, a county of Scotland, ſurrounded on all ſides by Perthſhire, except on the SW. where it is bounded by the river Forth, which divides it from Stirlingſhire. It is about 9 miles broad from N. to S. and where longeſt from E. to W. about 12. The country towards the Forth is plain and fertile, producing abundance of corn and paſture; and on the coaſt there are ſeveral excellent harbours for ſhipping, as well as creeks for the reception of boats employed in the fiſheries.—From the ſhore the ſurface riſes into the Ochil mountains, the higheſt of which, *Bencleugh*, lies in the pariſh of Tillycoultry. The ſides of theſe mountains afford excellent paſture for ſheep; but towards the ſummit the rocks appear quite bare. Agriculture has been conſiderably improved in this county, and the firſt plowing match in Scotland, in the way of competition for premium, was inſtituted in the pariſh of Clackmannan, (N° 2,) in 1781, by the gentlemen of the *Clackmannanſhire Farmer Club*. In general, however, there is more attention paid to paſture than tillage; yet the luxuriance of the crops frequently enable the farmers to export conſiderable quantities of corn. The valued rent of the county is 26,482 l. Scots, and the real land rent is about 14,200 l. ſterling. Coal is found in abundance almoſt every where; freeſtone and granite are alſo in great plenty. In the Ochills, at various times, have been wrought valuable ores of ſilver, lead, copper, cobalt, iron-ſtone, and antimony; many beautiful ſpecimens of *ſeptaria*, or *geodes*; (iron ore,) are alſo found. Among the rubbiſh which is waſhed from the hills, pebbles, agates, and even topazes, are ſometimes diſcovered. In 1801, this county contained 10,858 inhabitants, who carry on a conſiderable foreign trade, and export ſalt, &c. They alſo manufacture ſail-cloth and coarſe linen, girdles, camblets, and plaids for the Highland regiments. This county joins with that of Kinroſs in ſending a repreſentative to the parliament.

(2.) Clackmannan, a pariſh of Scotland, about 6 miles long from SW. to NE. and 5 broad from SE. to NW. but of a very irregular form, being interſected by part of Alloa pariſh, and in one part only 2 miles broad. It is bounded on the S. by the Forth, and on the N. by the Devon. The climate is healthy, though rainy; and longevity is frequent The ſoil is various: 1000 acres on the banks of the Forth are rich and fertile: the reſt, conſiſting of 6132 acres, is in general a poor cold clay; of theſe, 166 acres are under natural wood, 538 under planting, nearly fit for cutting, and 20 under moſs. Wheat, beans, barley, and oats, are the chief produce. There are four collieries, two of which afford ſeams of coal nine feet thick. About 13,000 tons of coals are annually exported to Leith, Dunbar, Perth, &c. The two great diſtilleries of Kilbagie and Kennet-pans are both in this pariſh. The yearly duty paid to government by both, is now only 8000 l. but before the two laſt partial acts were paſſed in favour of the London traders, in 1788 and 1793, it amounted (ſays the rev. Mr Moodie.) to *a ſum conſiderably greater than the whole land tax of Scotland.* Iron works were eſtabliſhed, in July 1792, on the banks of the Devon, upon an extenſive ſcale. The population in 1801, was 2961, having increaſed 413 ſince 1791.

(3.) Clackmannan, a royal burgh, and the head town of the county, pleaſantly ſituated in the above pariſh, on an eminence 190 feet above the level of the Forth, which has a gradual deſcent on every ſide but the W. where it is bold and rocky, and where the old tower of Clackmannan ſtands, from whence there is a beautiful and romantic proſpect of the mountains of Benmore, Benledi, and Ben-Lomond, the town and caſtle of Stirling, the various windings of the Forth, the town of Alloa, &c. The great ſword and helmet of king Robert Bruce, and a large two-handed ſword of Sir J. Graham, the friend of the heroic Wallace, are preſerved in the tower. Clackmannan was long the ſeat of the chief of the Bruces, who were hereditary ſheriffs of the county before the juriſdictions were aboliſhed; and it is ſtill the ſeat of the Bruces of Kennet. The town, however, by no means correſponds with the beauty of its ſituation. The principal ſtreet is broad and ſpacious, but many of the houſes are mean and wretched; in the middle of the ſtreet ſtands the tolbooth and court-houſe, a heap of ruins, and a nuiſance to the public. Here the ſheriff ſometimes holds his court, and here the election of a member of parliament takes place. The harbour was formerly crooked and inconvenient, but was improved in 1772 by Sir Lawrence Dundas. The town contains about 640 inhabitants; and lies 33 miles N. by E. of Glaſgow. Lon. 3. 40. W. Lat. 56. 5. N.

* CLAD. *part. pret.* [This participle, which is now referred to *clothe*, ſeems originally to have belonged to *cloden*, or ſome ſuch word, like *kleeden*, Dutch.] Clothed; inveſted; garbed.—He hath *clad* himſelf with a new garment. 1 *Kings*.—

To her the weeping heav'ns become ſerene;
For her the ground is *clad* in chearful green.
Dryden.

CLADY, two villages of Ireland; 1. in Derry, 108 miles from Dublin: and, 2. in Tyrone.

CLAER. See CLAR.

CLAERBOROUGH, in Hayton, Nottinghamſhire.

CLAGENFURT, a town of Germany, and capital of the duchy of Carinthia, ſituated on the Glan, built ſquare, and ſurrounded with a good wall. It contains ſix churches and three convents. It has a manufacture of cloth, and a ſociety for the promoting of agriculture and uſeful arts. This town was taken by the French, after they had defeated the Auſtrians, in 1797. It is 50 miles N. of Tr[illegible], and 132 SW. of Vienna. Lon. 14. 20. E. Lat. 46. 53. N.

CLAGET, William, D. D. an eminent and learned divine, born in 1646. He was preacher to the ſociety of Gray's Inn; which employment he exerciſed until he died in 1688, being then one of the king's chaplains. Abp. Sharp gives him an excellent character; and biſhop Burnet has ranked him among thoſe worthy men, whoſe lives and labours contributed to reſcue the church from the reproaches, which the follies of others had drawn upon it. Dr Claget's principal work is his "Diſcourſe concerning the Operations of the Holy Spirit." He was one of thoſe excellent divines, who made a noble ſtand againſt the deſigns of James II. to introduce popery. Four volumes of his ſermons were publiſhed after his death by his brother Nicholas Claget, archdeacon of Sudbury.

(1.) CLAGGON BAY, a bay of Ireland, on the coaſt of Galway, S. of Claggon Point.

(2.) CLAGGON POINT, a cape of Ireland, on the W. coaſt of the county of Galway. Lon. 10. 4. W. of Greenwich. Lat. 53. 34. N.

* CLAIM. *n. ſ.* [from the verb.] 1. A demand of any thing, as due.—

You, in the right of lady Blanch your wife,
May then make all the *claim* that Arthur did.
Shakeſpeare.

Forſworn thyſelf! The traitor's odious name
I firſt return, and then diſprove thy *claim*. *Dryd.*

2. A title to any privilege or poſſeſſion in the hands of another.—Either there muſt have been but one ſovereign over them all, or elſe every father of a family had been as good a prince, and had as good a *claim* to royalty as theſe. *Locke*. 3. In law.—A demand of any thing that is in the poſſeſſion of another, or at the leaſt out of his own: as *claim* by charter, *claim* by deſcent. *Cowel*. 4. The phraſes are commonly to *make claim*, or to *lay claim*.—The king of Pruſſia *lays* in his *claim* for Neuf-Châtel, as he did for the principality of Orange. *Addiſon*.—If God, by poſitive grant, gave dominion to any man, primogeniture can *lay* no *claim* to it, unleſs God ordained. *Locke*.

* *To* CLAIM. *v. a.* [*clamer*, Fr.] To demand of right; to require authoritatively; not to beg or accept as favour, but to exact as due.—If only one man hath a divine right to obedience, no body can *claim* that obedience but he that can ſhew his right. *Locke*.—We muſt know how the firſt ruler, from whom any one *claims*, came by his authority, before we can know who has a right to ſucceed him in it. *Locke*.

* CLAIMABLE. *adj.* [from *claim*.] That which may be demanded as due.

* CLAIMANT. *n. ſ.* [from *claim*.] He that demands any thing as unjuſtly detained by another.

* *A* CLAIMER. *n. ſ.* [from *claim*.] He that makes a demand; he that requires any thing, as unjuſtly with-held from him.

CLAIN, a river of France, which paſſes by Poitiers, and runs into the Vienne, 3 miles S. of Chatellerault.

CLAINS, a town near Worceſter.

CLAIR, or ST CLAIR, a lake of N. America. See CLARE, N° 14.

CLAIRA, a town of France, in the department of the Eaſtern Pyrenees, 5 miles NE. of Perpignan.

CLAIRAC, a town of France, in the department of Lot and Garonne, and chief place of a canton, in the diſtrict of Tonneins, advantageouſly ſituated in a valley on the Drot, and containing about 3000 inhabitants. They raiſe tobacco and corn, and make a great deal of wine and brandy. Clairac is one league SE. of Tonneins, and 4½ NW of Agen.

CLAIRAULT, Alexis, a member of the French academy of ſciences, and one of the moſt illuſtrious mathematicians in Europe. In 1726, when not 13 years old, he preſented to the academy, "A memoir upon four new geometrical curves of his own invention;" and ſupported the character he thus laid a foundation for, by various publications afterwards. He publiſhed, *Elémens de Géometrie*, 1741, in 8vo; *Elémens d'Algebre*, 1746, in 8vo; *Théorie de la Figure de la Terre*, 1743, in 8vo: *Tables de la Lune*, 1754, in 8vo. He was concerned alſo in the *Journal des Sçavans*, which he furniſhed with many excellent extracts; and was one of the academicians who were ſent into the north to determine the figure of the earth. He died in 1756.

CLAIRE, a town of France, in the department of the Lower Seine, 10 miles N. of Rouen.

CLAIRFAIT, N. count de, a celebrated Auſtrian general, of whoſe birth we have learned only that he was a Walloon. He entered early on a military life, and in the imperial ſervice diſtinguiſhed himſelf againſt the Turks. He commanded the Auſtrian troops againſt France, in 1792, and in that eventful war diſplayed the moſt eminent military talents, though not accompanied with correſponding ſucceſs. When the combined armies of Auſtria and Pruſſia entered France, under the duke of Brunſwick, general Clairfait with the army under his command joined them, and they made a very rapid progreſs into France; but after the taking of Lonwy and Stenay, gen. Clairfait retired into the Low Countries, where he loſt the famous battle of Gemappe, owing to the ſuperior numbers and impetuoſity of the French, under the celebrated Dumourier; but though the ability of Clairfait had been eminently evinced during this conteſt, his military ſkill was ſtill more ſo, in his conſequent retreat acroſs the Rhine, Oct. 1, 1794. He was next attached to the army under the command of the prince of Cobourg, and atchieved conſiderable advantages at Altenhoven, Quievrain, Hanſen, and Famars. He commanded the left wing of the army at the battle of Nerwinde, and decided the victory. He was afterwards appointed to the command of the army in Flanders, oppoſed to Pichegru, with whom he bravely diſputed every foot of ground, till the inequality of his forces obliged him to abandon the country. In 1795, he got the command of the army of Mayence, and attacked the ſtrong camp which the French had formed before that city. Having forced this, and made a great number of priſoners, he was following up the victory with ardour, when he received an order to forbear. Upon this he gave in his reſignation, and retired to Vienna, where he was well received by the emperor. He was afterwards made a counſellor of war, and died at Vienna in 1798. Gen. Clairfait was a ſtrict diſciplinarian, but greatly beloved by his ſoldiers. Cool and intrepid, he formed his own plans, and ſaw them punctually executed under his own eye. The French conſidered him as the ableſt general among their opponents in the courſe of the war.

* CLAIR-OBSCURE. *n. ſ.* See CLARE-OBSCURE.

(1.) CLAIRVAUX, a town of France, in the dept. of the Aube, and chief place of a canton in the diſtrict of Bar ſur Aube, which took its name from a celebrated abbey, built there in 1115. It is two leagues S. of Bar ſur Aube.

(2.) CLAIRVAUX LES VAUXDAIN, a town of France, in the dept. of Jura, and chief place of a canton in the diſtrict of Orgelet, three leagues SE. of Lons le Saunier.

CLAISE, a river of France, which runs into the Creuſe, near La Haye.

CLAIX, a town of France, in the department of the Iſere, and chief place of a canton in the diſtrict of Grenoble, 4 miles S. of Grenoble.

CLAKTON, GREAT, } two villages in Eſſex,
CLAKTON, LITTLE, } E. of Merſey iſland,
near St Oſithe

(1.) CLAM, a town of Auſtria, 1 m. W. of Gran.

(2.) CLAM, in zoology. See VENUS.

CLAMART SOUS MEADON, a village of France, one league and a half SSW. of Paris.

* *To* CLAMBER. *v. n.* [probably corrupted from *climb*; as *climber*, *clamber*.] To climb with difficulty; as with both hands and feet.—The men there do not without ſome difficulty *clamber* up the acclivities, dragging their kine with them. *Ray.*—They were forced to *clamber* over ſo many rocks, and to tread upon the brink of ſo many precipices, that they were very often in danger of their lives. *Addiſon.*

CLAMECY, a town of France, in the dept. of the Nievre, at the conflux of the Beuvron and the Yonne. In one of the fauxbourgs of this town, the nominal biſhop of Bethlehem reſided; the ſee having been fixed here from the expulſion of the Chriſtians out of the Holy Land. His income was ſmall, and his dioceſe confined nearly to the place of his reſidence. It is 33 miles NE. of Nevers, 7 S. of Auxerre, and 121 S. by E. of Paris. Lon. 3. 36. E. Lat. 46. 28. N.

CLAMINE, or CLOMINES, a town of Ireland, in Wexford county.

* *To* CLAMM. *v. a.* [in ſome provinces, to *cleam*, from *clæmian*, Sax. to glew together.] To clog with any glutinous matter.—A ſwarm of waſps got into a honey-pot, and there they cloyed and *clammed* themſelves, 'till there was no getting out again. *L'Eſtrange.*

* CLAMMINESS. *n. ſ.* [from *clammy*.] Viſcoſity; viſcidity; tenacity; ropineſs.—A greaſy pipkin will ſpoil the *clammineſs* of the glew. *Mox.*

* CLAMMY. *adj.* [from *clamm*.] Viſcous; glutinous; tenacious; adheſive; ropy.—Bodies *clammy* and cleaving, have an appetite, at once, to follow another body, and to hold to themſelves. *Bacon.*—Neither the brain nor ſpirits can conſerve motion: the former is of ſuch a *clammy* conſiſtence, it can no more retain it than a quagmire. *Glanville.*—There is an unctuous *clammy* vapour that ariſes from the ſtum of grapes, when they lie maſhed together in the vat, which puts out a light when dipped into it. *Addiſon.*—The continuance of the fever, *clammy* ſweats, paleneſs, and at laſt a total ceſſation of pain, are ſigns of a gangrene and approaching death. *Arbuthnot.*

* CLAMOROUS. *adj.* [from *clamour*.] Vociferous; noiſy; turbulent; loud.—It is no ſufficient argument to ſay, that, in urging theſe ceremonies, none are ſo *clamorous* as Papiſts, and they whom Papiſts ſuborn. *Hooker.*—

Then various elements againſt thee join'd,
In one more various animal combin'd,
And fram'd the *clam'rous* race of buſy human kind. *Pope.*

—A pamphlet that will ſettle the wavering, inſtruct the ignorant, and inflame the *clamorous*. *Swift.*

* CLAMOUR. *n. ſ.* [*clamor*, Latin.] 1. Outcry; noiſe; exclamation; vociferation.—

Revoke thy doom,
Or whilſt I can vent *clamour* from my throat,
I'll tell thee thou do'ſt evil. *Shak.*

—The people then grew exorbitant in their *clamours* for juſtice. *King Charles.* 2. It is uſed ſometimes, but leſs fitly, of inanimate things.—

Here the loud Arno's boiſt'rous *clamours* ceaſe,
That with ſubmiſſive murmurs glides in peace. *Addiſon.*

* *To* CLAMOUR. *v. n.* [from the noun.] 1. To make outcries; to exclaim; to vociferate; to roar in turbulence.—The obſcure bird *clamour'd* the live-long night. *Shak.*—Let them not come in multitudes, or in a tribunitious manner; for that is to *clamour* counſels, not to inform them. *Bacon.* 2. In *Shakeſpeare* it ſeems to mean actively, to ſtop

from noiſe.—*Clamour* your tongues, and not a word more. *Shakſpeare.*

(1.) * CLAMP. *n. ſ.* [*clamp*, French.] 1. A piece of wood joined to another, as an addition of ſtrength. 2. A quantity of bricks.—To burn a *clamp* of brick of 16,000, they allow 7 ton of coals. *Mortimer.*

(2.) CLAMP, (§ 1. *def.* 3.) a pile of unburnt bricks built up for burning. They are built after the ſame manner as arches are built in kilns, viz. with a vacuity betwixt each brick's breadth for the fire to aſcend by; but with this difference, that inſtead of arching, they truſs over, or overſpan; that is, the end of one brick is laid about half way over the end of another, and ſo till both ſides meet within half a brick's length, and then a binding brick at the top finiſhes the arch.

(3.) CLAMP, in a ſhip, denotes a piece of timber applied to a maſt or yard to prevent the wood from burſting; and alſo a thick plank lying fore and aft under the beams of the firſt orlop, or ſecond deck, and is the ſame that the riſing timbers are to the deck.

(4.) CLAMP NAILS, ſuch nails as are uſed to faſten on clamps in the building or repairing of ſhips.

* *To* CLAMP. *v. a.* [from the noun.]—When a piece of board is fitted with the grain to the end of another piece of board croſs the grain, the firſt board is *clamped*. Thus the ends of tables are commonly *clamped* to preſerve them from warping. *Moxon.*

CLAMPETIA, in ancient geography, a town of the Brutii, one of thoſe which revolted from Hannibal, called LAMPETIA by Polybius. It is now called AMANTEA, or MANTIA.

(1.) * CLAN *n. ſ.* [probably of Scottiſh original; *klaan*, in the Highlands, ſignifies *children*.] 1. A family; a race.—Milton was the poetical ſon of Spenſer, and Mr Waller of Fairfax; for we have our lineal deſcents and *clans* as well as other families. *Dryden.* 2. A body or ſect of perſons, in a ſenſe of contempt.—Partridge and the reſt of his *clan* may hoot me for a cheat, if I fail in any ſingular particular. *Swift.*

(2.) CLAN, in hiſtory, and particularly in that of Scotland, means a tribe of people of the ſame race, and often all of the ſame name. The nations which over-ran Europe were originally divided into many ſmall tribes; and when they came to parcel out the lands which they had conquered, it was natural for every chieftain to beſtow a portion, in the firſt place, upon thoſe of his own tribe or family. Theſe all held their lands of him; and as the ſafety of each individual depended on the general union, theſe ſmall ſocieties clung together, and were diſtinguiſhed by ſome common appellation, either patronymical or local, long before the introduction of ſurnames or enſigns armorial. But when theſe became common, the deſcendants and relations of every chieftain aſſumed the ſame name and arms with him; other vaſſals were proud to imitate their example; and by degrees they were communicated to all thoſe who held of the ſame ſuperior. Thus clanſhips were formed; and, in a generation or two, that conſanguinity, which was at firſt in a great meaſure imaginary, was believed to be real. An artificial union was converted into a natural one: men willingly followed a leader, whom they regarded both as the ſuperior of their lands and the chief of their blood; and ſerved him not only with the fidelity of vaſſals, but the affection of friends. In the other feudal kingdoms, we may obſerve ſuch unions as we have deſcribed, imperfectly formed; but in Scotland, whether they were the production of chance or the effect of policy, or ſtrengthened by their preſerving their genealogies both genuine and fabulous, clanſhips were univerſal. Such a confederacy might be overcome; it could not be broken; and no change of manners or government has been able, in ſome parts of the kingdom, completely to diſſolve aſſociations which are founded upon prejudices ſo natural to the human mind. How formidable were nobles at the head of followers, who counting that cauſe juſt and honourable which their chief approved, were ever ready to take the field at his command, and to ſacrifice their lives in defence of his perſon or of his fame! Againſt ſuch men a king contended with great diſadvantage; and that cold ſervice, which money purchaſes, or authority extorts, was not an equal match for their ardour and zeal.

(3.) CLANS, HIGHLAND, MANNERS OF THE. The foregoing obſervations will receive conſiderable confirmation from what Sir John Dalrymple remarks of the Highland clans in his *Memoirs of Great Britain*. "The caſtle of the chieftain was a kind of palace to which every man of his tribe was made welcome, and where he was entertained according to his ſtation in time of peace, and to which all flocked at the ſound of war. Thus the meaneſt of the clan, conſidering himſelf to be as well born as the head of it, revered in his chieftain his own honour; loved in his clan his own blood; complained not of the difference of ſtation into which fortune had thrown him, and reſpected himſelf: the chieftain in return beſtowed a protection, founded equally on gratitude, and the conſciouſneſs of his own intereſt. Hence the Highlanders, whom more ſavage nations called *ſavage*, carried, in the outward expreſſion of their manners, the politeneſs of courts without their vices, and, in their boſoms, the high points of honour without its follies. In countries where the ſurface is rugged, and the climate uncertain, there is little room for the uſe of the plough; and, where no coal is to be found, and few proviſions can be raiſed, there is ſtill leſs for that of the anvil and ſhuttle. As the Highlanders were, upon theſe accounts, excluded from extenſive agriculture and manufacture alike, every family raiſed juſt as much grain, and made as much raiment as ſufficed for itſelf; and nature, whom art cannot force, deſtined them to the life of ſhepherds. Hence, they had not that exceſs of induſtry which reduces man to a machine, nor that want of it which ſinks him into a rank of animals below his own. They lived in villages built in vallies and by the ſides of rivers. At two ſeaſons of the year, they were buſy; the one in the end of ſpring and beginning of ſummer, when they put the plough into the little land they had capable of receiving it, ſowed their grain, and prepared their proviſion of turf for next winter's fuel; the other juſt before winter, when they reaped their harveſt: the reſt of the year was all their own for amuſement or for war. If not engaged in war, they indulged themſelves in ſummer in the moſt delicious of all pleaſures, to men in a cold climate and a romantic country, the enjoyment of the ſun, and of the ſummer views of nature; never in the houſe during the day, even ſleeping often at night in the open air, among the mountains and woods. They ſpent the winter in the chaſe, while the ſun was up; and, in the evening, aſſembling round a common fire, they entertained themſelves with the ſong, the tale, and the dance: but they were ignorant of ſitting days and nights at games of ſkill, or of hazard, amuſements which keep the body in inaction, and the mind in a ſtate of vicious activity! The want of a good, and even of a fine ear for muſic, was almoſt unknown amongſt them; becauſe it was kept in continual practice, among the multitude from paſſion, but by the wiſer few, becauſe they knew that the love of muſic both heightened the courage, and ſoftened the tempers of their people. Their vocal muſic was plaintive, even to the depth of melancholy; their inſtrumental, either lively for briſk dances, or martial for the battle. Some of their tunes even contained the great but natural idea, of a hiſtory deſcribed in muſic: the joys of a marriage, the noiſe of a quarrel, the ſounding to arms, the rage of a battle, the broken diſorder of a flight,—the whole concluding with the ſolemn dirge and lamentation for the ſlain. By the loudneſs and artificial jarring of their war inſtrument, the bagpipe, which played continually during the action, their ſpirits were exalted to a phrenzy of courage in battle. They joined the pleaſures of hiſtory and poetry to thoſe of muſic, and the love of claſſical learning to both. For, in order to cheriſh high ſentiments in the minds of all, every conſiderable family had an hiſtorian who recounted, and a bard who ſung, the deeds of his clan and of its chieftain: and all, even the loweſt in ſtation, were ſent to ſchool in their youth; partly becauſe they had nothing elſe to do at that age, and partly becauſe literature was thought the diſtinction, not the want of it the mark of good birth. The ſeverity of their climate, the height of their mountains, the diſtance of their villages from each other, their love of the chaſe and of war, with their deſire to viſit and be viſited, forced them to great bodily exertions. The vaſtneſs of the objects which ſurrounded them, lakes, mountains, rocks, cataracts, extended and elevated their minds: for they were not in the ſtate of men, who only know the way from one town to another. Their want of regular occupation led them, like the ancient Spartans, to contemplation, and the powers of converſation: powers which they exerted in ſtriking out the original thoughts which nature had ſuggeſted, not in languidly repeating thoſe which they had learned from other people. They valued themſelves without undervaluing other nations. They loved to quit their own country to ſee and to hear, adopted eaſily the manners of others, and were attentive and inſinuating wherever they went. When ſtrangers came amongſt them, they received them not with a ceremony which forbids a ſecond viſit, not with a coldneſs which cauſes repentance of the firſt, not with an embarraſſment which leaves both the landlord and his gueſt in equal miſery, but with the moſt pleaſing of all politeneſs, the ſimplicity and cordiality of affection; proud to give that hoſpitality which they had not received, and to humble the perſons who had thought of them with contempt, by ſhewing how little they deſerved. Having been driven from the low countries of Scotland by invaſion, they, from time immemorial, thought themſelves intitled to make repriſals upon the property of their invaders; but they touched not that of each other: ſo that in the ſame men there appeared, to thoſe who did not look into the cauſes of things, a ſtrange mixture of vice and of virtue. For what we term theft and rapine, they termed right and juſtice. But from the practice of theſe repriſals, they acquired the habits of being enterpriſing, artful, and bold. An injury done to one of a clan, was held to be an injury done to all, on account of the common relation of blood. Hence the Highlanders were in the habitual practice of war: and hence their attachment to their chieftain, and to each other, was founded upon the two moſt active principles of human nature, love of their friends and reſentment againſt their enemies. But the frequency of war tempered its ferocity. They bound up the wounds of their priſoners, while they neglected their own; and in the perſon of an enemy, reſpected and pitied the ſtranger. They went always completely armed: a faſhion, which by accuſtoming them to the inſtruments of death, removed the fear of death itſelf; and which, from the danger of provocation, made the common people as polite, and as guarded in their behaviour, as the gentry of other countries. From theſe combined circumſtances, the higher ranks and the lower ranks of the Highlanders alike joined that refinement of ſentiment, which, in all other nations, is peculiar to the former, to that ſtrength and hardineſs of body, which in other countries, is poſſeſſed only by the latter. To be modeſt as well as brave; to be contented with the few things which nature requires; to act and to ſuffer without complaining; to be as much aſhamed of doing any thing inſolent or injurious to others, as of bearing it when done to themſelves; and to die with pleaſure, to revenge the affronts offered to their clan or their country: theſe they conſidered their higheſt accompliſhments. In religion, every man followed with indifference of ſentiment, the mode which his chieftain had aſſumed.—Their dreſs, which was the laſt remains of the Roman habit in Europe, was well ſuited to the nature of their country, and ſtill better to the neceſſities of war. It conſiſted of a roll of light woollen called a plaid, ſix yards in length and two in breadth, wrapped looſely round the body, the upper lappet of which reſted on the left ſhoulder, leaving the right arm at full liberty; a jacket of thick cloth fitted tightly to the body; and a looſe ſhort garment of light woollen, which went round the waiſt and covered the thigh. In rain, they formed the plaid into folds, and laying it on the ſhoulders, were covered as with a roof. When they were obliged to lie abroad in the hills, in their hunting parties, or tending their cattle, or in war, the plaid ſerved them both for bed and for covering; for, when three men ſlept together, they could ſpread three folds of cloth below and ſix above them. The garters of their ſtockings were tied under their knee, with a view to give more freedom to the limb; and they wore no breeches, that they might climb mountains with the greater eaſe. The lightneſs and looſeneſs of their dreſs, the cuſtom they had of going always on foot, never on horſeback, their love of long journies, but above all, that patience of hunger, and every kind of hardſhip, which carried their bodies forward, even after their ſpirits were exhauſted, made them exceed all other European nations in ſpeed and perſeverance of march. In encampments, they were expert at forming beds in a moment, by tying together bunches of heath, and fixing them upright in the ground; an art, which, as the beds were both ſoft and dry, preſerved their health in the field, when other ſoldiers loſt theirs. Their arms were a broad ſword, a dagger, called a dirk, a target, a muſket, and two piſtols: ſo that they carried the long ſword of the Celtes, the pugio of the Romans, the ſhield of the ancients, and both kinds of modern fire-arms, all together. In battle they threw away the plaid and under garment, and fought in their jackets, making thus their movements quicker, and their ſtrokes more forcible. Their advance to battle was rapid, like the charge of dragoons: when near the enemy, they ſtopped a little to draw breath and diſcharge their muſkets, which they then dropped on the ground: advancing, they fired their piſtols, which they threw, almoſt at the ſame inſtant, againſt the heads of their opponents: and then ruſhed into their ranks with the broad ſword, threatening, and ſhaking the ſword as they ran on, ſo as to conquer the enemy's eye, while his body was yet unhurt. They fought not in long and regular lines, but in ſeparate bands, like wedges condenſed and firm; the army being ranged according to the clans which compoſed it, and each according to its families; ſo that there aroſe a competition in valour of clan with clan, of family with family, of brother with brother. To make an opening in regular troops, and to conquer, they reckoned the ſame thing; becauſe in cloſe engagements, and in broken ranks, no regular troops could withſtand them. They received the bayonet in the target, which they carried on the left arm; then turning it aſide, or twiſting it in the target, they attacked with the broad ſword, the enemy encumbered and defenceleſs; and, where they could not wield the broad ſword, they ſtabbed with the dirk." The indiſſolubility of theſe aſſociations has been already noticed; and it may now be added, that, though the abolition of the feudal ſyſtem effected a greater alteration in the character of theſe people, by inſpiring them with ſentiments and views of independence, during the laſt century, than a thouſand years before had effected, yet the ſenſibility of their nature, the hardineſs of their conſtitution, their warlike diſpoſition, and their generous hoſpitality to ſtrangers, remain undiminiſhed. And though emancipated now from the feudal yoke, they ſtill ſhew a voluntary reverence to their chiefs, as well as affection to thoſe of their own tribe and kindred: qualities which are not only very amiable and engaging in themſelves, but which are connected with that character of alacrity and inviolable fidelity and reſolution which their exertions in the field have juſtly obtained in the world.

* CLANCULAR. *adj.* [*clancularius*, Lat.] Clandeſtine; ſecret; private; concealed; obſcure; hidden.—Let us withdraw all ſupplies from our luſts, and not by any ſecret reſerved affection give them *clancular* aids to maintain their rebellion. *Decay of Piety.*

(1.) * CLANDESTINE. *adj.* [*clandeſtinus*, Lat.] Secret; hidden; private; in an ill ſenſe.—

Tho' nitrous tempeſts, and *clandeſtine* death,
Fill'd the deep caves, and num'rous vaults beneath. *Blackmore.*

(2.) CLANDESTINE MARRIAGE is that which is performed without the publication of bans, the conſent of parents, &c.

* CLANDESTINELY. *adv.* [from *clandeſtine.*] Secretly; privately; in private; in ſecret.—There have been two printed papers *clandeſtinely* ſpread about, whereof no man is able to trace the original. *Swift.*

CLANDON, EAST, } two villages in Surrey,
CLANDON, WEST, } near Guidford.

CLANE, a town of Ireland, in Kildare county, on the Liffey, 16 miles from Dublin.

CLANE-CONNEL. See WARINGSTOWN.

CLANFIELD, the name of 3 villages; viz. 1. near Fifield; 2. near Hambledon, both in Hampſhire: and 3. in Oxfordſhire, near Radcot Bridge.

* CLANG. *n. ſ.* [*clangor*, Lat.] A ſharp, ſhrill noiſe.—

What *clangs* were heard in German ſkies afar,
Of arms and armies ruſhing to the war! *Dryd.*
Guns, and trumpets *clang*, and ſolemn ſound
Of drums, o'ercame their groans. *Philips.*

(2.) * *To* CLANG. *v. a.* To ſtrike together with a noiſe.—

The fierce Curetes trode tumultuous
Their myſtic dance, and *clang'd* their ſounding arms;
Induſtrious with the warlike din to quell
Thy infant cries. *Prior.*

(2.) * *To* CLANG. *v. n.* [*clango*, Lat.] To clatter; to make a loud ſhrill noiſe.—

Have I not in a pitched battle heard
Loud 'larums, neighing ſteeds, and trumpets *clang?* *Shakeſp.*

* CLANGOUR. *n. ſ.* [*clangor*, Lat.] A loud ſhrill ſound.—

With joy they view the waving enſigns fly,
And hear the trumpet's *clangour* pierce the ſky. *Dryden.*

* CLANGOUS *adj.* [from *clang.*] Making a clang.—We do not obſerve the cranes, and birds of long necks, have any muſical, but harſh and *clangous* throats. *Brown.*

* CLANK. *n. ſ.* [from *clang.*] A loud, ſhrill, ſharp noiſe, made by the colliſion of hard and ſonorous bodies.—They were joined by the melodious *clank* of marrow-bone and clever. *Spectator.*

CLANMAY, a river in the Iſle of Man.

CLANNABOROUGH, a town in Devonſhire, near Bow and Crediton.

CLANROAD, a village in Clare, Ireland.

(1.) * CLAP. *n. ſ.* [from the verb.] 1. A loud noiſe made by ſudden colliſion.—Give the door ſuch a *clap* as ye go out, as will ſhake the whole room.

room, and make every thing rattle in it. *Swift.* 2. A ſudden or unexpected act or motion.—It is monſtrous to me, that the ſouth ſea ſhould pay half their debts at one *clap.* *Swift.* 3. An exploſion of thunder.—There ſhall be horrible *claps* of thunder, and flaſhes of lightning, voices and earthquakes. *Hakewell.* 4. An act of applauſe.—The actors, in the midſt of an innocent old play are often ſtartled in the midſt of unexpected *claps* or hiſſes. *Addiſon.* 5. A ſudden or unexpected miſfortune. Obſolete. 6. A venereal infection. [from *clapoir*, Fr.]—

Time, that at laſt matures a *clap* to pox. *Pope.*

7. [With falconers.] The nether part of the beak of a hawk.

(2.) Clap, in medicine, (§ 1. *def.* 6.) the firſt ſtage of the venereal diſeaſe. See Gonorrhoea.

(1.) * *To* Clap. *v. a.* [*clappan*, Sax. *klappen*, Dutch.] 1. To ſtrike together with a quick motion, ſo as to make a noiſe by the colliſion.—Men ſhall *clap* their hands at him, and ſhall hiſs him out of his place. *Job.*—Have you never ſeen a citizen, in a cold morning, *clapping* his ſides, and walking before his ſhop? *Dryden.*—

He crowing *clapp'd* his wings, th' appointed call
To chuck his wives together in the hall. *Dryden.*

2. To add one thing to another, implying the idea of ſomething haſty, unexpected, or ſudden.—They *clap* mouth to mouth, wing to wing, and leg to leg; and ſo, after a ſweet ſinging, fall down into lakes. *Carew.*—This pink is one of Cupid's carriers: *clap* on more ſails; purſue. *Shak.*—If you leave ſome ſpace empty for the air, then *clap* your hand upon the mouth of the veſſel, and the fiſhes will contend to get uppermoſt in the water. *Ray.*—It would be as abſurd as to ſay, he *clapped* ſpurs to his horſe at St James's and galloped away to the Hague. *Addiſon.*—Socrates or Alexander might have a fool's coat *clapt* upon them, and perhaps neither wiſdom nor majeſty would ſecure them from a ſneer. *Watts.* 3. To do any thing with a ſudden haſty motion, or unexpectedly.—He was no ſooner entered into the town, but a ſcambling ſoldier *clapt* hold of his bridle, which he thought was in a begging or in a drunken faſhion. *Wotton.*—So much from the reſt of his countrymen, and indeed from his whole ſpecies, that his friends would have *clapped* him into bedlam, and have begged his eſtate. *Spectator.* 4. To celebrate or praiſe by clapping the hands; to applaud.—I have often heard the ſtationer wiſhing for thoſe hands to take off his melancholy bargain, which *clapped* its performance on the ſtage. *Dedication.* 5. To infect with a venereal poiſon. [See the noun.]—If the patient hath been *clapt*, it will be the more difficult to cure him the ſecond time, and worſe the third. *Wiſeman.* 6. *To* Clap *up.* To complete ſuddenly, without much precaution.—

No longer than we well could waſh our hands,
To *clap* this royal bargain *up* of peace. *Shak.*

—A peace may be *clapped up* with that ſuddenneſs, that the forces, which are now in motion, may unexpectedly fall upon his ſkirts. *Howel.* 7. *To* Clap *up.* To impriſon with little formality or delay.—Being preſented to the emperor for his admirable beauty, he was known, and the prince *clapt* him *up* as his inveigler. *Sandys.*

(2.) * *To* Clap. *v. n.* 1. To move nimbly with a noiſe.—

A whirlwind roſe, that, with a violent blaſt,
Shook all the dome: the doors around me *clapt.*
Dryden.

2. To enter with alacrity and briſkneſs upon any thing.—

Come, a ſong.——
—Shall we *clap* into't roundly, without ſaying
we are hoarſe? *Shak.*

3. To ſtrike the hands together in applauſe.—

All the beſt men are ours; for 'tis ill hap
If they hold, when their ladies bid 'em *clap.*
Shak.

CLAP BOARD. See Board, § III.

CLAPCOT, a village near Wallingford, Berkſhire.

CLAPERSGATE, near Ambleſide, Weſtmorland.

CLAPHAM, the name of 5 villages; viz. 1. near Bedford; 2. in Berks, near Wickham; 3. in Surry, 3 miles SW. from London; 4. in Suſſex, SE. of Arundel: and 5. in the W. Riding of Yorkſhire, 6 miles NW. of Settle, on the Lancaſter road. It has a fair 21ſt Sept.

CLAP-NET, in birding, a ſort of net contrived for the taking of larks with the looking-glaſs, by the method called *daring* or *doring*. The nets are ſpread over an even piece of ground, and the larks are invited to the place by other larks faſtened down, and by a looking glaſs compoſed of 5 pieces, and fixed in a frame ſo that it is turned round very ſwiftly backwards and forwards, by a cord pulled by a perſon at a conſiderable diſtance behind a hedge. See Doring.

* CLAPPER. *n. ſ.* [from *clap.*] 1. One who claps with his hands; an applauder. 2. The tongue of a bell.—He hath a heart as ſound as a bell, and his tongue is the *clapper*; for what his heart thinks, his tongue ſpeaks. *Shak.* 3. *The* Clapper *of a Mill.* A piece of wood ſhaking the hopper.

* *To* Clapperclaw. *v. a.* [from *clap* and *claw.*] To tongue-beat; to ſcold.—

They've always been at daggers drawing,
And one another *clapperclawing.* *Hudibras.*

CLAPTON, 3 villages; viz. 1. in Glouceſterſhire, on an eminence, W. from Bourton on the Water: 2. in Hackney pariſh, Middleſex; and 3. near Portbury, Somerſetſhire.

CLAR, or Claer, in metallurgy, bone-aſhes perfectly calcined, and finely powdered, kept purpoſely for covering the inſides of Coppels.

(1.) CLARA, an iſland in the Indian Sea, near the coaſt of Siam, called alſo, Mel. It is 25 miles long, and 4 broad. Lon. 97. 50. E. Lat. 11. 4. N.

(2.) Clara, a town in the iſland of Cuba, 18 miles NW. of Spiritu Santo.

(3.) Clara, a village of Ireland, in King's County, Leinſter, nearly 49 miles from Dublin.

(4.) Clara elb, a river of Sweden.

(5.) Clara, St, an iſland of Peru in S. America, ſituated in Guayaquil Bay, 70 miles SW. of Guayaquil. Lon. 80. 20. W. Lat. 3. 38.

(6.) Clara, St. See Clare, No 13.

CLARAMONT powder, a kind of earth called *terra de Baira*, from the place where it is found; it is famous at Venice, for its efficacy in ſtopping hemorrhages of all kinds, and in curing malignant fevers.

CLARANBRIDGE, a village of Ireland, in the county of Galway, Connaught.

CLARATUMBA, a town of Poland, in Cracovia, 4 miles E. of Cracow.

(1.) **CLARE**, a county of Ireland, bounded on the N. by the county of Galway, on the E. by Tipperary, on the S by Limerick and Kerry, and on the W. by the ſea. It contains 79 pariſhes, about 17,400 houſes, and 96,000 ſouls. Some parts of the county are mountainous, which, however feed a great number of cattle and ſheep; while the more level grounds are very fertile, and yield good crops of corn and hay. Clare, or Ennis, is the capital. The principal river is the Shannon. Three members are returned to parliament, viz. two for the county, and one for the town of Care, N° 8.

(2.) **Clare**, an iſland of Ireland, near the coaſt of Mayo, about four miles long, and one and a half broad. Lon. 9. 49. W. of Greenwich. Lat. 53. 49. N.

(3.) **Clare**, an iſland of Ireland near the SW coaſt of Cork, about 3 miles long, and one broad. Lon. 9. 23. W. of Greenwich. Lat. 51. 21. N.

(4.) **Clare**, a river of Ireland, which runs into the Corrib, 4 miles N. of Galway.

(5.) **Clare**, a river of Suffolk which runs into the Stour.

(6.) **Clare**, a town of England, in the county of Suffolk, ſituated on the river Stour, with the ruins of a caſtle and a monaſtery. It gives the title of duke to a branch of the royal family. There is a weekly market on Friday. It is 14 miles ſouth of Bury St Edmonds, and 56 NNE. of London.

(7.) **Clare**, a valley of Scotland, in Roſsſhire, pleaſantly ſituated on the banks of the Skiack, and containing about 200 acres of arable land and meadow ground.

(8.) **Clare**, or **Ennis**, a large and populous town of Ireland, the capital of the county, N° 1. ſituated on the Fergus, which is navigable for large boats from the Shannon, and adds greatly to the trade of the town. It is 17 miles NW. of Limerick. Lon. 8. 54. W. Greenwich. Lat. 52. 49. N.

(9–11.) **Clare**, the name of 3 Iriſh villages; 1. in Armagh, 65 miles from Dublin: 2. in King's County, Leinſter: and 3. in Mayo county, 103 miles from Dublin.

(12.) **Clare, St**, one of the Canary iſlands, between Lancerota and Alagranza.

(13.) **Clare, St**, or **St Clara**, was born in the town of Aſſiſa in Italy; and having renounced the world to dedicate herſelf to religion, gave birth to the order that bears her name, in 1212. See N° 15.

(14.) **Clare, St, lake**, a lake of the United States, about half way between Lake Huron and Lake Erie, and is about 90 miles in circumference. It receives the water of the three great lakes, Superior, Michigan, and Huron, and diſcharges them through the river Detroit, into Lake Erie. This lake is of a circular form, and navigable for large veſſels, except a bar of ſand towards the middle, which prevents loaded veſſels from paſſing. The cargoes of ſuch as are freighted muſt be taken out, and carried acroſs the bar in boats, and re-ſhipped.

(15.) **Clare, St, nuns of**, were founded in Aſſiſa in Italy; about 1212. They obſerved the rule of St Francis, and wore habits of the ſame colour with thoſe of the Franciſcan friars: and hence were called *Minoreſſes*; and their houſe, without Aldgate, the Minories, where they were ſettled, when firſt brought over into England, about A. D. 1293. They had only three houſes beſides this. See Clarisses.

Clare constat, precept of, in Scots law, the warrant of a ſuperior for entering and infefting the heir of his former vaſſal, without the interpoſition of an inqueſt.

CLAREMONT, a town in Surry, near Eſher.

CLAREMORE, in Galway, Ireland.

* **CLARENCEUX**, or
(1.) * **CLARENCIEUX**, } *n. ſ.* The ſecond king at arms: ſo named from the duchy of *Clarence*.

(2.) **Clarencieux** was ſo named from the duke of Clarence, to whom he firſt belonged: for Lionel, 3d ſon to Edward III. having by his wife the honour of Clare in the county of Thomond, was afterwards declared duke of Clarence; which dukedom afterwards eſcheating to Edward IV. he made this earl king at arms. His office is to marſhal and diſpoſe of the funerals of all the lower nobility, as baronets, knights, eſquires, on the ſouth ſide of the Trent; whence he is ſometimes called *ſurroy* or *ſouth roy*, in contradiſtinction to *norroy*.

(1.) **CLARENDON**, a county of S. Carolina, in the moſt ſouthern part of Camden diſtrict. It is bounded on the E. by Georgetown diſtrict; on the W. by Orangeburg; on the S. by Charleſton, and on the N. by Salem county. It is 30 miles long, and 30 broad; and in 1790 contained 2,392 inhabitants of whom 602 were ſlaves. A court is held in it quarterly.

(2.) **Clarendon**, a large river of N. Carolina. See Fear, cape.

(3.) **Clarendon**, a pariſh in Jamaica.

(4.) **Clarendon**, a village three miles E. of Saliſbury, where Henry II. ſummoned a council of the barons and prelates, in 1164, who enacted the laws, called the Conſtitutions of Clarendon; and here were two palaces built by king John.

(5.) **Clarendon, Earl of.** See Hyde.

(6.) **Clarendon, constitutions of**, certain conſtitutions made in the reign of Henry II. A. D. 1164, in a parliament held at Clarendon; whereby the king checked the power of the Pope and his clergy, and greatly narrowed the total exemption they claimed from ſecular juriſdiction.

(7.) **Clarendon, fort**, lies on the W. coaſt of Barbadoes, 1½ miles S. of Speight town.

(8.) **Clarendon park**, 3 miles E. of Saliſbury.

CLARENNA, in ancient geography, a town of Vindelicia, at the confluence of the Lycus and Danube, now called *Rain*. See Rain, N° 2.

CLARENS, or **Chatillard**, a village of Swiſſerland, in the Pays de Vaud, celebrated as the principal ſcene of Rouſſeau's Eloiſe. It is delightfully ſituated, not far from Vevay, on an eminence, whoſe gentle declivity ſlopes gradually toward the lake of Geneva. It commands a view of that majeſtic body of water, its fertile borders, and the bold rocks and Alps of Savoy. The adjacent ſcenery conſiſts of vineyards, fields of corn and paſture, and rich groves of oak, aſh, and Spaniſh cheſnut trees.

CLARENZA. See Chiarenza, N° 1. & 2.

* CLARE-OBSCURE. *n. ſ.* [from *clarus*, bright, and *obſcurus*, Lat.] Light and ſhade in painting.—

As maſters in the *clare-obſcure*,
With various light our eyes allure;
A flaming yellow here they ſpread,
Draw off in blue, or charge in red;
Yet from theſe colours, oddly mix'd,
Your ſight upon the whole is fix'd. *Prior*

(1.) * CLARET. *n. ſ.* [*clairet*, Fr.] French wine, of a clear pale red colour.—Red and white wine are in a trice confounded into *claret*. *Boyle*.—

The *claret* ſmooth, red as the lips we preſs
In ſparkling fancy, while we drain the bowl.
Thomſon.

(2.) Claret, a town of France, in the department of the Herault, and chief place of a canton, in the diſtrict of Montpellier, five leagues north of Montpellier.

(3.) Claret, a town of France, in the department of the Lower Alps, and chief place of a canton, in the diſtrict of Siſteron, eleven miles north of Siſteron.

Claret-hall, a town in Eſſex, on the Stour.

CLARETOWN, a town of Ireland, in Clare.

(1.) * CLARICORD. *n. ſ.* [from *clarus* and *ebordo*, Lat.] A muſical inſtrument in form of a ſpinette, but more ancient.—It has 49 or 50 keys, and 70 ſtrings, *Chambers*.

(2.) Claricord. See Manichord.

(1.) * CLARIFICATION. *n. ſ.* [from *clarify*.] The act of making any thing clear from impurities.—Liquors are, many of them, at the firſt, thick and troubled; as muſte, and wort: to know the means of accelerating *clarification*, we muſt know the cauſes of *clarification*. *Bacon*.

(2.) Clarification. The ſubſtances uſually employed for clarifying liquors, are whites of eggs, blood, and iſinglaſs. The two firſt are uſed for ſuch liquors as are clarified whilſt boiling hot; the laſt for thoſe which are clarified in the cold, ſuch as wines, &c. The whites of eggs are beat up into a froth, and mixed with the liquors upon which they unite with, and entangle the impure matters that floated in it; and preſently growing hard by the heat, carry them up to the ſurface in form of a ſcum no longer diſſoluble in the liquid. Blood operates in the ſame manner, and is chiefly uſed in purifying the brine from which ſalt is made. Great quantities of iſinglaſs are uſed for fining turbid wines. For this purpoſe ſome throw an entire piece, about a quarter of an ounce, into a wine caſk; by degrees the glue diſſolves, and forms a ſkin upon the ſurface, which at length ſubſiding, carries down with it the feculent matter which floated in the wine. Others previouſly diſſolve the iſinglaſs, and having boiled it to a ſlimy conſiſtence, mix it with the liquor, roll the caſk ſtrongly about, and then ſuffer it to ſtand to ſettle. Neuman queſtions the wholeſomeneſs of wines thus purified; and aſſures us that he himſelf, after drinking only a few ounces of ſack thus clarified, but not ſettled quite fine, was ſeized with ſickneſs and vomiting, followed by ſuch a vertigo, that he could not ſtand upright for a minute together. The giddineſs continued with a nauſea and want of appetite for ſeveral days.

(1.) * *To* CLARIFY. *v. a.* [*clarifier*, French.] 1. To purify or clear any liquor; to ſeparate from feculencies or impurities.—The apothecaries *clarify* their ſyrups by whites of eggs, beaten with the juices which they would *clarify*; which whites of eggs gather all the dregs and groſſer parts of the juice to them; and after, the ſyrup being ſet on the fire, the whites of eggs themſelves harden, and are taken forth. *Bacon*. 2. To brighten; to illuminate. This ſenſe is rare.—This will was then ductile and pliant to all the motions of right reaſon: it met the dictates of a *clarified* underſtanding half way. *South*.—The Chriſtian religion is the only means that God has ſanctified, to ſet fallen man upon his legs again, to *clarify* his reaſon, and to rectify his will. *South*.

(2.) * *To* Clarify. *v. n.* To clear up, to grow bright.—Whoſoever hath his mind fraught with many thoughts, his wits and underſtanding do *clarify* and break up in the diſcourſing with another; he marſhalleth his thoughts more orderly, he ſeeth how they look when they are turned into words. *Bacon's Eſſays*.

CLARIGATIO, in Roman antiquity, a ceremony that always preceded a formal declaration of war. It was thus performed: firſt 4 heralds crowned with vervain, were ſent to demand ſatiſfaction for the injuries done the Roman ſtate. Theſe heralds taking the gods to witneſs that their demands were juſt, one of them, with a clear voice, demanded reſtitution within a limited time, commonly 33 days; which being expired without reſtitution made, then the *pater patratus*, or prince of the heralds, proceeded to the enemies frontiers, and declared war.

CLARII Apollinis nanum, a temple and grove of Apollo, ſituated between Colophon and Lebedos, in Ionia; called Claros by Thucydides, and Ovid.

(1.) * CLARION, *n. ſ.* [*clarin*, Spaniſh, from *clarus*, loud, Lat.] A trumpet; a wind inſtrument of war.—

And after, to his palace, he them brings,
With ſhams, and trumpets, and with *clarions*
ſweet;
And all the way the joyous people ſings. *Spenſer*.
Let fuller notes th' applauding world amaze,
And the loud *clarion* labour in your praiſe. *Pope*

(2.) *A* Clarion has its tube narrower, and its tone acuter and ſhriller than that of the common trumpet. It is ſaid that the clarion, now uſed among the Moors, and Portugueſe, who borrowed it from the Moors, ſerved anciently for a treble to ſeveral trumpets, which ſounded tenor and baſs.

CLARISFORD, a town of Ireland, in Clare county, a mile from Killaloe.

CLARISSES, an order of nuns ſo called from their founder St Clara or St Clare. See Clare, N 13, & 15. This order comprehends not only the nuns that follow the rule of St Francis, according to the ſtrict letter without mitigation, but the

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likewiſe who follow the ſame rule mitigated by ſeveral popes. After Eerdinand Cortez had conquered Mexico for the king of Spain, Iſabella of Portugal, wife of the emperor Charles V. ſent thither ſome nuns of the order of St Clara, who made ſeveral ſettlements there. Near their monaſteries were founded communities of Indian young women, to be inſtructed by the clariſſes in religion, and ſuch works as were ſuitable to perſons of their ſex. Theſe communities are ſo conſiderable that they uſually conſiſt of 400 or 500.

* CLARITY. *n. ſ.* [*clarté*, French; *claritas*, Latin.] Brightneſs; ſplendour.—A light by abundant *clarity* inviſible; an underſtanding which itſelf can only comprehend. *Sir Walter Raleigh.*—Man was not only deceivable in his integrity, but the angels of light in all their *clarity*. *Brown.*

CLARIUS, an epithet of Apollo.

(1.) CLARKE, Dr Samuel, a preacher and writer of conſiderable note in the reign of Charles II. was, during the inter-regnum, and at the time of the ejection, miniſter of St Bennet Fink in London. In Nov. 1660 he, in the name of the preſbyterian miniſters, preſented an addreſs of thanks to the king for his declaration of liberty of conſcience. He was one of the commiſſioners of the Savoy; and behaved on that occaſion with great prudence and moderation. He ſometimes attended the church as an hearer and communicant; and was much eſteemed by all that knew him, for his probity and induſtry. The moſt valuable of his numerous works are ſaid to be his Lives of the Puritan Divines and other perſons of note, 22 of which are printed in his martyrology: the reſt are in his *Lives of ſundry Eminent Perſons in this latter Age*, fol. and in his *Marrow of Eccleſiaſtical Hiſtory*, in fol. and 4to. He died in 1680.

(2.) CLARKE, Samuel, the ſon of the Dr (N° 1.) was fellow of Pembroke hall in Cambridge, but was ejected from his fellowſhip for refuſing to take the engagements, as he was alſo afterwards from his rectory of Grendon in Buckinghamſhire. He applied himſelf early to the ſtudy of the ſcriptures; and his annotations on the Bible, printed together with the ſacred text, is highly commended by Dr Owen, Mr Baxter, and Dr Calamy. He died in 1701, aged 75.

(3.) CLARKE, Samuel, D. D. a very celebrated Engliſh divine, was the ſon of Edward Clarke, Eſq; alderman of Norwich, and M. P. for ſeveral years. He was born at Norwich Oct. 11, 1675, and inſtructed in claſſical learning at the free ſchool of that town. In 1691, he removed to Caius college, Cambridge, where his uncommon abilities ſoon began to diſplay themſelves. Though the Carteſian ſyſtem was at that time the eſtabliſhed philoſophy of the univerſity, yet Clarke made himſelf maſter of the new ſyſtem of Newton; and in order to his firſt degree of arts, performed a public exerciſe in the ſchools upon a queſtion taken from it. He contributed much to the eſtabliſhment of the Newtonian philoſophy by an excellent tranſlation of *Rohault's Phyſics*, which he finiſhed with notes before he was 22 years of age. Rohault's ſyſtem of natural philoſophy was then generally taught in the univerſity. It was founded altogether upon Carteſian principles, and very ill tranſlated into Latin. Clarke gave a new tranſlation, and added ſuch notes as might lead ſtudents inſenſibly and by degrees to truer notions than could be found there. "And this certainly (ſays Biſhop Hoadly) was a more prudent method of introducing truth unknown before, than to attempt to throw aſide this treatiſe entirely, and write a new one inſtead of it." The ſucceſs anſwered to his hopes; and he was doubtleſs a great benefactor to the univerſity in this attempt. For the true philoſophy has thus without any noiſe, prevailed. Whiſton relates, that, in 1697, while he was chaplain to Moore biſhop of Norwich, he met young Clarke, then wholly unknown to him, at a coffee-houſe in that city; where they entered into a converſation about the Carteſian philoſophy; particularly Rohault's Phyſics, which Clarke's tutor, as he tells us, had put him upon tranſlating. "The reſult of this converſation was (ſays Whiſton,) that I was greatly ſurprized that ſo young a man as Clarke then was, ſhould know ſo much of thoſe ſublime diſcoveries, which were then almoſt a ſecret to all, but to a few particular mathematicians." This tranſlation of Rohault was firſt printed in 1697, 8vo. There were 4 editions of it, in every one of which improvements were made; eſpecially in the laſt, in 1718, which was tranſlated by Dr John Clarke, dean of Sarum, the author's brother, and publiſhed in 2 vols 8vo. Afterwards he turned his thoughts to divinity; and ſtudied the Old Teſtament in Hebrew, the New in Greek, and the primitive Chriſtian writers. Having taken orders, he became chaplain to Bp. Moore, who was ever after his friend and patron. In 1699 he publiſhed "Three practical Eſſays on Baptiſm, Confirmation, and Repentance;" and "Some Reflections on that part of a book called Amyntor, or a Defence of Milton's Life, which relates to the Writings of the Primitive Fathers, and the Canon of the New Teſtament." In 1701 he publiſhed "A Paraphraſe upon the Goſpel of St Matthew;" which was followed, in 1702, by the "Paraphraſes upon the Goſpels of St Mark and St Luke," and ſoon after by a 3d volume "upon St John." They were afterwards printed together in 2 vols 8vo; and have ſince undergone ſeveral editions. Mean time Bp. Moore gave him the rectory of Drayton near Norwich, and procured for him a pariſh in that city; and theſe he ſerved himſelf in that ſeaſon when the biſhop reſided at Norwich. In 1704 he was appointed to preach Boyle's lecture; and the ſubject he choſe was, "The being and attributes of God." In this, he gave ſuch high ſatiſfaction, that he was appointed to preach the ſame lecture the next year; when he choſe for his ſubject "The evidences of natural and revealed religion." Theſe ſermons were firſt printed in two diſtinct volumes; the former in 1705, the latter in 1706. They have ſince been printed in one volume, under the general title of "A Diſcourſe concerning the Being and Attributes of God, the Obligations of natural Religion, and the Truth and Certainty of the Chriſtian Revelation, in anſwer to Hobbes, Spinoza, the Author of the Oracles of Reaſon, and other Deniers of natural and revealed Religion." Clarke having endeavoured in the firſt part of this work to ſhow, that the being of a God may be demonſtrated by arguments *à priori*, incurred the cenſure which Pope paſſed upon this method of reaſoning in the following lines, put into the mouth of one of his dunces;

"Let others creep by timid ſteps and ſlow,
"On plain experience lay foundations low,
"We nobly take the high *priori* road,
"And reaſon downward, till we doubt of God."

Dunciad, b. 4. l. 455.

Upon which we have the following note: "Thoſe who, from the effects in this viſible world, deduce the eternal power and Godhead of the firſt cauſe, though they cannot attain to an adequate idea of the Deity, yet diſcover ſo much of him as enables them to ſee the end of their creation and the means of their happineſs: whereas they who take this high priori road, as Hobbes, Spinoſa, Des Cartes, and ſome better reaſoners, for one that goes right, ten loſe themſelves in miſts, or ramble after viſions, which deprive them of all ſight of their end, and miſlead them in the choice of wrong means." Clarke, it is probable, would not have denied this; and the poet perhaps would have ſpared his better reaſoners, and not have joined them with ſuch company, had he recollected our author's apology for uſing the argument *à priori*. "The argument *à poſteriori* (ſays he) is indeed by far the moſt generally uſeful argument, moſt eaſy to be underſtood, and in ſome degree ſuited to all capacities; and therefore it ought always to be inſiſted upon: But for as much as atheiſtical writers have ſometimes oppoſed the being and attributes of God by ſuch metaphyſical reaſonings, as can no otherwiſe be obviated than by arguing *à priori;* therefore this manner of arguing alſo is uſeful and neceſſary in its proper place." As to the merit, indeed, of his whole work, including the evidences of natural and revealed religion, it is undoubtedly of the firſt order. It reflects honour on the age as well as the author that produced it, and will deſcend, with reputation, to a late poſterity. The defence, in particular, of the ſacred original and authority of Chriſtianity, is admirably conducted. In 1706 he publiſhed "A Letter to Mr Dodwell;" wherein all the arguments in his epiſtolary diſcourſe againſt the immortality of the ſoul are particularly anſwered. The celebrated Collins, coming in as a ſecond to Dodwell, went much farther into the philoſophy of the diſpute, and indeed ſeemed to produce all that could poſſibly be ſaid againſt the immateriality of the ſoul, as well as the liberty of human actions. But our author in reply wrote with ſuch clearneſs and demonſtration, as ſhewed him greatly ſuperior to his adverſaries in metaphyſical and phyſical knowledge; and made every intelligent reader rejoice, that ſuch an incident had happened to extort from him that ſtrong reaſoning and perſpicuity of reaſoning, which were ſo much wanted upon this intricate ſubject. Clarke's letter to Dodwell was ſoon followed by 4 defences of it in 4 ſeveral letters to him, containing, "Remarks on a pretended Demonſtration of the Immateriality and natural Immortality of the Soul, &c." They were afterwards all printed together; and the "Anſwer to Toland's Amyntor" added to them. In the midſt of all theſe labours, he found time to ſhow his regard to mathematical and phyſical ſtudies, and exact knowledge and ſkill in them. And his capacity for theſe ſtudies was not a little improved by the friendſhip of Sir Iſaac Newton; at whoſe requeſt he tranſlated his *Optics* into Latin in 1706. With this verſion Sir Iſaac was ſo highly pleaſed, that he preſented him with the ſum of L. 500, or L. 100 for each child, Clarke having then five children. This year alſo, Bp. Moore, who had long formed a deſign of fixing him more conſpicuouſly, procured for him the rector of St Bennet's, London; and ſoon after carried him to court, and recommended him to the favour of queen Anne. She appointed him one of her chaplains in ordinary; and preſented him to the rectory of St James's, Weſtminſter, in 1709. Upon his advancement to this ſtation, he took the degree of D. D. when the public exerciſe which he performed for it at Cambridge was prodigiouſly admired. The queſtions which he maintained were theſe: 1. *Nullam fidei Chriſtianæ dogma, in ſacris ſcripturis traditum, eſt rectæ rationi diſſentaneum; i. e.* "No article of the Chriſtian faith, delivered in the holy Scriptures, is diſagreeable to right reaſon." 2. *Sine actionum humanarum libertate nulla poteſt eſſe religio;* that is, "Without the liberty of human actions there can be no religion." His theſis was upon the firſt of theſe queſtions; which being properly ſifted by that moſt acute diſputant profeſſor James, he made an extempore reply, in a continued diſcourſe for near half an hour, with ſo little heſitation, that many of the auditors were aſtoniſhed, and owned, that if they had not been within ſight of him, they ſhould have ſuppoſed him to have read every word of it. Through the courſe of the ſyllogiſtical diſputation, he guarded ſo well againſt the arts which the profeſſor was a complete maſter of; replied ſo readily to the greateſt difficulties he could propoſe; and preſſed him ſo hard with clear and intelligible anſwers, that perhaps there never was ſuch a conflict heard in thoſe ſchools. The profeſſor, who was a man of humour as well as learning, ſaid to him at the end of the diſputation, *Profecto, me probe exercuiſti;* that is, "on my word, you have worked me ſufficiently;" and the members of the univerſity went away, admiring, that Clarke, after an abſence of ſo many years, and a long ſeries of buſineſs of quite another nature, ſhould acquit himſelf in ſuch a manner, as if academical exerciſes had been his conſtant employment; and with ſuch fluency and purity of expreſſion, as if he had been accuſtomed to converſe in no other language but Latin. The ſame year, he reviſed and corrected Whiſton's tranſlation of the *Apoſtolical Conſtitutions* into Engliſh. Whiſton tells us, that his own ſtudies having been chiefly upon other things, and having rendered him incapable of being alſo a critic in words and languages, he deſired his great friend and great critic, Dr Clarke to reviſe that tranſlation; which he was ſo kind as to agree to. In 1712, he publiſhed a moſt beautiful and pompous edition of Cæſar's commentaries, adorned with elegant ſculptures. It was printed in folio; and afterwards in 1720, 8vo. It was dedicated to the great duke of Marlborough. The doctor took particular care of the punctuation. In the annotations, he ſelected the beſt and moſt judicious in former editions, with ſome corrections of his own interſperſed. Mr Addiſon ſays of this work, "The new edition, which is given us of Cæſar's commentaries, has already been taken notice of in foreign gazettes, and is a work that does honour to the Engliſh preſs. It is no wonder that an edition ſhould be very correct, which has paſſed through the hands of one of the moſt accurate, learned, and judicious writers this age has produced. The beauty of the paper, of the character, and of the ſeveral cuts with which this noble work is illuſtrated, makes it the fineſt book I have ever ſeen; and is a true inſtance of the Engliſh genius, which, though it does not come the firſt into any art, generally carries it to greater heights than any other country in the world." This noble work has been riſing in value to this time. A copy of this edition in large paper, moſt ſplendidly bound in morocco, was ſold at the Hon. Mr Beauclerk's ſale for L. 44. The binding had coſt Mr Beauclerk five guineas. The ſame year, 1712, Dr Clarke publiſhed his celebrated book intituled, "The Scripture Doctrine of the Trinity," &c. which is divided into three parts. The firſt is, a collection and explication of all the texts in the "New Teſtament," relating to the doctrine of the Trinity; in the 2d, the foregoing doctrine is ſet forth at large, and explained in particular and diſtinct propoſitions; and, in the 3d, the principal paſſages of the liturgy of the church of England, relating to the doctrine of the Trinity, are conſidered. Bp. Hoadly applauds our author's method of proceeding, in forming his ſentiments upon ſo important a point. He knew (ſays he,) and all men agreed, that it was a matter of mere revelation. He had not recourſe to abſtract and metaphyſical reaſonings to cover or patronize any ſyſtem he might have embraced before. But, as a Chriſtian, he laid open the New Teſtament before him. He ſearched out every text, in which mention was made of the three perſons or any one of them. He accurately examined the meaning of the words about every one of them; and by the beſt rules of grammar and critique, and by his ſkill in language, he endeavoured to fix plainly what was declared about every perſon, and what was not. And what he thought to be the truth, he publiſhed under the title of 'The Scripture Doctrine of the Trinity.' The biſhop adds, that "every Chriſtian divine and layman ought to pay his thanks to Dr Clarke for the method into which he brought his diſpute; and for that collection of texts of the New Teſtament, by which at laſt it muſt be decided, on which ſide ſoever the truth may be ſuppoſed to lie." This work not only occaſioned a great number of books and pamphlets to be wrote againſt it, but made its author obnoxious to the power eccleſiaſtical, and his book to be complained of by the Lower Houſe of Convention. The Doctor drew up a preface, and afterwards gave in ſeveral explanations, which ſeemed to ſatisfy the Upper Houſe; at leaſt the affair was not brought to any iſſue, the members appearing deſirous to prevent diſſenſions. In 1715 and 1716, he had a diſpute with the celebrated Leibnitz, relating to the principles of natural philoſophy and religion; and a collection of the papers which paſſed between them was publiſhed in 1717. This performance is inſcribed to queen Caroline, then princeſs of Wales. It related chiefly to the difficult ſubjects of *liberty and neceſſity*. In 1718, Dr Clarke made an alteration in the forms of doxology in the ſinging pſalms, which produced no ſmall noiſe, and occaſioned ſome pamphlets to be written. The alteration was this:

"To God, through Chriſt, his only Son,
Imortal glory be," &c.——and
"To God, through Chriſt, his Son, our Lord,
All glory be therefore," &c.

A conſiderable number of theſe ſelect pſalms and hymns having been diſperſed by the Society for Promoting Chriſtian Knowledge, before the alteration of the doxologies was taken notice of, he was charged with a deſign of impoſing upon the ſociety; whereas, in truth, the edition of them had been prepared by him for the uſe of his own pariſh only, before the ſociety had thoughts of purchaſing any of the copies; and as the uſual forms of doxology are not eſtabliſhed by any legal authority, eccleſiaſtical or civil, in this he had not offended. About this time, he was preſented by Lord Lechmere, the chancellor of the duchy of Lancaſter, to the maſterſhip of Wigſton's hoſpital in Leiceſter. In 1724, he publiſhed 17 ſermons, 11 of which were never before printed; and in 1725, another upon the erecting of a charity ſchool for the education of women ſervants. In 1727, upon the death of Sir Iſaac Newton, he was offered by the court, the place of maſter of the Mint, worth from 1200 to 1500l. a-year. But this, being a ſecular preferment, he abſolutely refuſed. Whiſton takes this to be one of the moſt glorious actions of his life, and to afford undeniable conviction, that he was in earneſt in his religion. In 1728, was publiſhed, "A Letter from Dr Clarke to Mr Benjamin Hoadly, F. R. S. occaſioned by the controverſy, relating to the Proportion of Velocity and Force in Bodies in motion;" and printed in the *Philoſ. Tranſ.* N° 401. In 1729, he publiſhed the 12 firſt books of "Homer's Iliad"; in 4to. The Latin verſion is almoſt entirely new; and annotations are added to it. Homer, Bp. Hoadly tells us, was Clarke's admired author, even to a degree of enthuſiaſm, hardly natural to his temper. "The Tranſlation," adds the biſhop, "with his corrections, may now be ſtyled accurate; and his notes, as far as they go, are indeed a treaſury of grammatical and critical knowledge. He was called to his taſk by royal command; and he has performed it in ſuch a manner, as to be worthy of the young prince, for whom it was laboured." The year of this publication was the laſt of this great man's life. Tho' not robuſt, he had always enjoyed a firm ſtate of health, without any indiſpoſition that confined him, except the ſmall-pox in his youth; till, on Sunday May 11, 1729, going out in the morning to preach before the judges at Serjeant's inn, he was ſeized with a pain in his ſide, which quickly became ſo violent, that he was obliged to be carried home. He went to bed, and thought himſelf ſo much better in the afternoon, that he would not ſuffer himſelf to be blooded. But the pain return-ſing violently about two the next morning, made bleeding abſolutely neceſſary; he appeared to be out of danger, and continued to think himſelf ſo, till the Saturday morning following; when the pain removed from his ſide to his head; and deprived him of his ſenſes. He continued breathing till between 7 or 8 that evening, May 17, 1729; and then died, in his 54th year. Soon after his death were publiſhed, from his original MSS. by his brother Dr John Clarke, "An Expoſition of the Church Catechiſm," and ten volumes of ſermons, in 8vo. Few diſcourſes are more judicious, and fewer ſtill are equally inſtructive. The reaſoning and the practical parts are excellent, and the explanations of ſcripture are uncommonly valuable. Three years after the Doctor's death, appeared alſo the XII. Laſt Books of the Iliad, publiſhed in 4to by his ſon, Mr Samuel Clarke. Dr Clarke married Catharine, the daughter of the rev. Mr Lockwood, rector of Little Miſſingham in Norfolk, with whom he lived happy till his death; and by whom he had 7 children. In the various branches of uſeful knowledge and critical learning, he was, perhaps without an equal; in all united, certainly without a ſuperior: in his works, the beſt defender of religion; in his practice, the greateſt ornament to it: in his converſation communicative and inſtructive: in his preaching and writings, ſtrong, clear, and calm; in his life, high in the eſteem of the wiſe, the good, and the great; in his death, lamented by every friend to learning, truth, and virtue. Dr Clarke was of a very humane and tender diſpoſition. When his young children amuſed themſelves with killing flies, he calmly reaſoned with them, in ſuch a familiar manner, as was calculated to make a powerful impreſſion upon their minds. He was very condeſcending in anſwering ſcruples; numberleſs inſtances of which occured in the courſe of his life. He was peculiarly cautious, not to loſe the leaſt minute of his time. He always carried ſome book with him, which he would read whilſt riding in a coach, or walking in the fields, or when he had any leiſure moments free from company or ſtudy. Nay, he would read even in company, where he might take ſuch a liberty without offence to good manners. His memory was remarkably ſtrong. He never forgot any thing which he had once thoroughly apprehended and underſtood. He was of a cheerful, and even playful diſpoſition. Once, when the two Dr Clarkes, Mr Bott and ſeveral men of ability and learning were together, and amuſing themſelves with diverting tricks, Dr Samuel Clarke looking out of the window, ſaw a grave blockhead approaching to the houſe; upon which he cried out, "Boys, boys, be wiſe, here comes a fool." This turn of mind has been cenſured, but in Dr Clarke we can hardly conſider it as a frailty. To be poſſeſſed of ſuch a temper, muſt have been no ſmall degree of happineſs; as it probably enabled him to purſue his important and ſerious ſtudies with greater vigour. To be capable of deriving amuſement from trivial circumſtances, indicates a heart at eaſe, and may generally be regarded as the concomitant of virtue, eſpecially in a perſon devoted to ſtudy.

(4.) **Clarke**, William, an Engliſh divine, was born at Haghmon-abbey in Shropſhire, 1696; and after a grammar education at Shrewſbury ſchool, was ſent to St John's college, Cambridge, of which he was elected fellow, Jan. 17, 1616; B. A. 1731, and M. A. 1735. He was preſented by archbiſhop Wake in 1724 to the rectory of Buxted in Suſſex, at the recommendation of Dr Wotton, whoſe daughter he married. In 1738; he was made prebendary and reſidentiary of the cathedral church of Chicheſter. Some years before this he had given a ſpecimen of his literary abilities, in a preface to Dr Wotton's *Leges Walliæ Eccleſiaſticæ et Civiles Hoeli Boni, et aliorum Walliæ Principum*; or Eccleſiaſtical and Civil Laws of Howel Dha, and other princes of Wales. But Mr Clarke's chief work was, "The Connection of the Roman, Saxon, and Engliſh Coins; deducing the Antiquities, Cuſtoms, and Manners of each people to modern times; particularly the Origin of Feudal Tenures, and of Parliaments: Illuſtrated throughout with critical and hiſtorical Remarks on various Authors, both ſacred and profane." It was publiſhed, in one vol. 4to, in 1767. It was dedicated to the duke of Newcaſtle, whoſe beneficent diſpoſition is celebrated for having conferred obligations upon the author, which were not the effects of importunity. Mr Clarke's performance was peruſed in MS. by Arthur Onſlow, Eſq. ſpeaker of the houſe of commons, who gave him ſome uſeful hints and obſervations; but he was chiefly indebted to Mr Bowyer, who took upon him all the care of the publication, drew up ſeveral of the notes, wrote part of the diſſertation on the Roman ſeſterce, and formed an admirable index to the whole. By this work our author acquired a great and juſt reputation. Indeed, it reflects honour upon the country by which it is produced; for there are few performances that are more replete with profound learning. Mr Clarke's laſt promotions were the chancellorſhip of the church of Chicheſter, and the vicarage of Amport, in 1770. He died 21ſt Oct. 1771. He had reſigned, in 1768, the rectory of Buxted to his ſon Edward. In Mr Nichols's Anecdotes of Bowyer, there are ſeveral letters written to that learned printer by Mr Clarke, which diſplay him to great advantage as a man of piety, a friend, and a ſcholar. He is repreſented by Mr Hayley, who was his intimate acquaintance, as not only a man of extenſive erudition, but as poſſeſſed of the pleaſing talent of communicating his various knowledge in familiar converſation, without any appearance of pedantry or preſumption. Antiquities were the favourite ſtudy of Mr Clarke; but he was a ſecret, and by no means an unſucceſsful, votary of the muſes. He wrote Engliſh verſe with eaſe, elegance, and ſpirit. Perhaps there are few better epigrams in our language than the following, which he compoſed on ſeeing the words *Domus ultima* inſcribed on the vault belonging to the dukes of Richmond in the cathedral of Chicheſter.

Did he, who thus inſcrib'd the wall,
Not read, or not believe St Paul,
Who ſays there is, where'er it ſtands,
Another houſe not made with hands?
Or, may we gather from theſe words,
That houſe is not a *houſe of Lords*?

He ſet ſo little value on his poetical compoſitions,

the

that they were ſeldom committed to paper, and are therefore very imperfectly preſerved by thoſe to whom he ſometimes recited them. His taſte and judgment in poetry appears indeed very ſtriking in many parts of his learned and elaborate *Connection of Coins*. His illuſtration of Neſtor's cup, in particular, may be eſteemed as one of the happieſt examples of that light which an elegant antiquarian may throw on a cloudy and miſtaken paſſage of an ancient poet. In ſtrict attention to all the duties of his ſtation, in the moſt active and unwearied charity, he was a model to the miniſters of God. Though his income was never large, it was his cuſtom to devote a ſhilling of every guinea that he received to the ſervice of the poor. In the relative duties of life, his conduct was amiable, and his moſt ſtriking feature, was genuine unaffected piety."

(5.) Clarke, in geography, a county of Kentucky, bounded on the N. by Bourbon; on the E. by Fayette; on the S. by Madiſon, and on the W. by Maſon.

(6.) Clarke, a town of the United States, in Virginia, 9 miles NW. of Richmond.

CLARKEN-GREEN, in Hampſhire, 4 miles W. of Baſingſtoke.

CLARKSBURG, a town of Virginia, the capital of Harriſon county, ſeated on the E. ſide of the Monongahela, 40 miles above Morgan-town, and 9 NW. of Richmond. A monthly court is held in it every 3d Monday.

CLARKSTOWN, a town of Pennſylvania, 25 miles W. of Reading.

(1.) CLARKSVILLE, a town of the United States, in the South-Weſtern Territory, and county of Tenneſſee, pleaſantly ſituated on the E. ſide of Cumberland, at the mouth of Red-river. It has a court houſe, in which a county court is held quarterly. It is 45 miles NW. of Naſhville, 220 W. by N. of Knoxville, and 940 W. by S. of Philadelphia, from which it lies in Lon. 14. 1. W. Lat. 36. 25. N. but from Greenwich, in Lon. 87. 45. W. Lat. 37. 2. N.

(2.) Clarksville, a town in the North-Weſtern Territory of the United States, ſeated on the N. ſide of the Ohio, within view of Louiſville, a mile below the Rapids, and 45 W. of Frankfort.

CLARO, a village in Northumberland, N. of the Picts Wall, near Halton Hall.

(1.) CLARO-OBSCURO, or Clair-obscure, in painting, the art of diſtributing to advantage the lights and ſhadows of a piece, both with reſpect to the eaſing of the eye and the effect of the whole piece. See Painting.

(2.) Claro-obscuro, or Chiaro-scuro, is alſo uſed to ſignify a deſign conſiſting only of two colours, moſt uſually black and white, but ſometimes black and yellow; or it is a deſign waſhed only with one colour, the ſhadows being of a duſky brown, and the lights heightened up by white. The word is alſo applied to prints of two colours taken off at twice.

CLAROS. See Clarii, and Clarus, N° 4.

CLARTHY, a river of S. Wales, in Cardigan and Rednor counties, which joins the Clarwen at the NW. extremity of Brecknockſhire.

(1.) CLARUS, a fountain of Ionia, which was fabled to inſpire with prophetic fury.

(2.) Clarus, a mountain of Ionia.

(3.) Clarus, an iſland of the Ægean ſea, between Tenedos and Scios.

(4.) Clarus, in ancient geography, a town of Ionia, famous for an oracle of Apollo, thence named Clarius. It was built by Manto, daughter of Tireſias, who fled from Thebes after it had been deſtroyed by the Epigoni.

(5.) Clarus Mons. See Arverni, N° 2. and Clermont, N° 4.

CLARWEN, a river of S. Wales, which runs into the Wye, near Rhyader-Gawy.

(1.) * CLARY. *n. ſ.* [*horminium*, Lat.] An herb.—Plants that have circled leaves do all abound with moiſture. The weakeſt kind of curling is roughneſs: as in *clary* and burr. *Bacon.*

(2.) Clary, in botany. See Salvia.

(3.) Clary water is compoſed of brandy, ſugar, clary flowers, and cinnamon, with a little ambergris diſſolved in it. It helps digeſtion, and is cardiac. This water is rendered either purgative or emetic, by adding reſin of jalap and ſcammony, or *crocus metallorum*. Some make clary water of brandy, juice of cherries, ſtrawberries, and gooſeberries, ſugar, cloves, white pepper, and coriander ſeeds; infuſed, ſugared, and ſtrained.

CLASEY, a town near Hawkſhead, Lancaſhire.

* CLASH. *n. ſ.* [from the verb.] 1. A noiſy colliſion of two bodies.—

The *claſh* of arms and voice of men we hear.
Denham.

2. Oppoſition; contradiction.—

Then from the *claſhes* between popes and kings,
Debate, like ſparks from flint's colliſion, ſprings.
Denham.

(1.) * *To* Clash. *v. a.* [*kletſen*, Dut. to make a noiſe.] To ſtrike one thing againſt another, ſo as to produce a noiſe —

The nodding ſtatue *claſh'd* his arms,
And with a ſullen ſound and feeble cry,
Half ſunk, and half pronounced the word of victory.
Dryden.

(2.) * *To* Clash. *v. n.* 1. To make a noiſe by mutual colliſion; to ſtrike one againſt another.—Thoſe few that ſhould happen to *claſh*, might rebound after the colliſion. *Bentley.*—How many candles may ſend out their light, without *claſhing* upon one another; which argues the ſmallneſs of the parts of light, and the largeneſs of the interſtices between particles of air and other bodies. *Cheyne.* 2. To act with oppoſite power, or contrary direction.—Neither was there any queen-mother who might *claſh* with his counſellors for authority. *Bacon.*—Thoſe that are not convinced what help this is to magiſtracy, would find it, if they ſhould chance to *claſh*. *South.* 3. To contradict; to oppoſe.—Wherever there are men, there will be *claſhing* ſometime or other; and a knock, or a conteſt, ſpoils all. *L'Eſtrange.*—The abſurdity in this inſtance is obvious; and yet every time that *claſhing* metaphors are put together, this fault is committed. *Spectator.*

CLASHMORE, a village of Ireland, in the county of Waterford, Munſter.

CLASMIUM, [from κλασμα, Gr. a ſmall particle,]

ticle,] in natural hiſtory, a genus of foſſils, of the claſs of the gypſums. They are of a ſoft texture, and of a dull opaque look, being compoſed, as the other gypſums, of irregularly arranged flat particles. The name is derived from the flaky ſmall particles of which they are compoſed. There is only one ſpecies; of a tolerably regular and even ſtructure; though very coarſe and harſh to the touch. It is of a very lively and beautiful red colour; and is found in thick roundiſh maſſes, which, when broken, are ſeen compoſed of irregular arrangements of flat particles; and emulate a ſtriated texture. It will neither give fire with ſteel nor ferment with acids; but calcines very eaſily, and affords a very valuable Paris plaſter, as do all the purer gypſums. It is common in Italy, and is greatly eſteemed there; it is alſo found in ſome parts of England, particularly Derbyſhire.

* *A* CLASP. *n. ſ.* [*cheſpe*, Dutch.] 1. A hook to hold any thing cloſe; as a book, or garment.—

The ſcorpion's claws here graſp a wide extent,
And here the crabs in leſſer *claſps* are bent.
Addiſon.

—He took me aſide, opening the *claſps* of the parchment cover. *Arbuth. and Pope.* 2. An embrace, in contempt.—

Your fair daughter,
Tranſported with no worſe nor better guard,
But with a knave of hire, a gondalier,
To the groſs *claſps* of a laſcivious Moor. *Shak.*

* *To* Clasp. *v. a.* [from the noun.] 1. To ſhut with a claſp.—Sermons are the keys of the kingdom of heaven, and do open the ſcriptures; which being but read, remain, in compariſon, ſtill *claſped. Hooker.*—

There Caxton ſlept, with Wynkin at his ſide,
One *claſp'd* in wood, and one in ſtrong cow hide. *Pope.*

2. To catch and hold by twining.—

Direct
The *claſping* ivy where to climb. *Milton.*

3. To hold with the hands extended; to incloſe between the hands.—Occaſion turneth the handle of the bottle firſt to be received, and after the belly, which is hard to *claſp. Bacon.* 4. To embrace.—

Thy ſuppliant
I beg, and *claſp* thy knees. *Milton.*
Now, now he *claſps* her to his panting breaſt;
Now he devours her with his eager eyes. *Smith.*

5. To incloſe.—

Boys, with women's voices,
Strive to ſpeak big, and *claſp* their female joints,
In ſtiff unwieldy arms againſt thy crown. *Shak.*

(1.) * CLASPER. *n. ſ.* [from *claſp*.] The tendrels or threads of creeping plants, by which they cling to other things for ſupport.—The tendrels or *claſpers* of plants are given only to ſuch ſpecies as have weak and infirm ſtalks. *Ray.*

(2.) Clasper. See Cirrhus, and Botany.

* CLASPKNIFE. *n. ſ.* [from *claſp* and *knife*.] A knife which folds into the handle.

(1.) * CLASS. *n. ſ.* [from *claſſis*, Lat.] 1. A rank or order of perſons.—Segrais has diſtinguiſhed the readers of poetry, according to their capacity of judging, into three *claſſes. Dryden.* 2. A number of boys learning the ſame leſſon at the ſchool.—We ſhall be ſeized away from this lower *claſs* in the ſchool of knowledge, and our converſation ſhall be with angels and illuminated ſpirits. *Watts.* 3. A ſet of beings or things; a number ranged in diſtribution, under ſome common denomination.—Among this herd of politicians, any one ſet make a very conſiderable *claſs* of men. *Addiſon.*

Whate'er of mongrel, no one *claſs* admits
A wit with dunces, and a dunce with wits. *Pope.*

(2.) Class, (§ 1. *def.* 3.) in methodical arrangement, is applied to the moſt general diviſions of things: Thus animals and plants are divided into claſſes, which are again ſubdivided into ſerieſes or orders, and theſe laſt into genera. See Botany and Zoology.

* *To* Class. *v. a.* [from the noun.] To range according to ſome ſtated method of diſtribution; to range according to different ranks.—I conſidered that, by the *claſſing* and methodizing ſuch paſſages, I might inſtruct the reader. *Arbuthnot.*

CLASSENDORF, a town of Bohemia, in the circle of Leitmeritz, 5 miles N. of Kamnitz.

* CLASSICAL. } *adj.* [*claſſicus*, Lat.] 1. Re-
(1.) * CLASSICK. } lating to literature.—

Poetick fields encompaſs me around,
And ſtill I ſeem to tread on *claſſick* ground.
Addiſon.

—With them the genius of *claſſick* learning dwelleth, and from them it is derived. *Felton* 2. Of the firſt order or rank.—From this ſtandard the value of the Roman weights and coins are reduced: in the ſettling of which I have followed Mr Greaves, who may be juſtly reckoned a *claſſical* author on this ſubject. *Arbuthnot.*

(2.) * Classick. *n. ſ.* [*claſſicus*, Lat.] An authour of the firſt rank: uſually taken for ancient authors.—

The *claſſicks* of an age that heard of none.
Pope.

(3.) Classick, or Classical, (§ 1. *def.* 2.) is chiefly applied to authors read in the claſſes at ſchools. This term is ſaid to owe its origin to Servius Tullius, who, in order to make an eſtimate of every perſon's eſtate, divided the Roman people into ſix bands, which he called *claſſes*. The eſtate of the firſt claſs was not to be under 200 l. and theſe by way of eminence were called *claſſici*, claſſics: hence authors of the firſt rank came to be called *claſſics*, all the reſt being ſaid to be *infra claſſem*: Thus Ariſtotle is a claſſic author in philoſophy; Homer in Greek poetry, Horace in Latin, &c.

CLASSICUM, in antiquity, the alarm for battle, given by the Roman generals; and ſounded by martial muſic throughout the army.

CLASSICUS. See Census, § 3.

CLASSIFICATION, *n. ſ.* Arrangement by claſſes, orders, genera, &c.

* CLASSIS. *n. ſ.* [Lat.] Order; ſort; body—He had declared his opinion of that *claſſis* of men, and did all he could to hinder their growth. *Claren.*

CLATERCOT, a village of Oxfordſhire.

(1.) CLATFORD, near Marlborough, Wilts.

(2.) Clatford Upper, in Hampſhire, near Andover.

CLATHE, knock of, a hill of Scotland, in the pariſh of Kettle, Fifeſhire. A ſtone coffin, with human bones, ſeveral trinkets, and the braſs head of the ſpear, now in Lord Leven's poſſeſſion, were found in it ſome years ago.

CLATHRA, in antiquity, the goddeſs who preſided over the CLATHRI.

CLATHRI, in antiquity, bars of wood or iron, uſed in ſecuring doors and windows.

(1.) CLATON, a village in Staffordſhire, S. of Newcaſtle under Line.

(2.) CLATON HALL, E. of Mancheſter.

(3.) CLATON IN THE DALE, } two villages in
(4.) CLATON IN THE MOOR, } Lancaſhire, between Blackburn and Burnloy.

(1.) CLATT, a pariſh of Scotland, in Aberdeenſhire, ſeated in the Weſtern extremity of the diſtrict of Garioch. Its ſituation being among hills, the climate is cold, windy and rainy. The ſoil is various, and agriculture in its infancy. The firſt carts were only introduced in 1760. Servitudes are ſtill exacted, and retard improvements. Turnips and potatoes thrive well. There are quarries of granite, and variegated marble; but the latter have not yet been wrought. The population, in 1801, was 433. The turnpike road from Edinburgh to Elgin, &c. paſſes through this pariſh.

(2.) CLATT, a town in the above pariſh, (N° 1.) which was erected into a burgh of barony, by king James IV. in 1501.

* *A* CLATTER. *n. ſ.* [from the verb.] 1. A rattling noiſe made by the frequent and quick colliſion of ſonorous bodies. A *clatter* is a *claſh* often repeated with great quickneſs, and ſeems to convey the idea of a ſound ſharper and ſhriller than *rattle.* [See the verb.]—I have ſeen a monkey overthrow all the diſhes and plates in a kitchen, merely for the pleaſure of ſeeing them tumble, and hearing the *clatter* they made in their fall. *Swift.* 2. It is uſed for any tumultuous and confuſed noiſe.—

By this great *clatter*, one of greateſt note
Seems bruited. *Shak.*
The jumbling particles of matter,
In chaos made not ſuch a *clatter.* *Swift.*

(1.) * *To* CLATTER. *v. a* [*clatrunge*, a rattle, Sax.] 1. To ſtrike any thing ſo as to make it ſound and rattle.—

When all the bees are gone to ſettle,
You *clatter* ſtill your brazen kettle. *Swift.*

2. To diſpute, jar, or clamour. *Martin.* A low word.

(2.) * *To* CLATTER. *v. n.* 1. To make a noiſe by knocking two ſonorous bodies frequently together.—

Now the ſprightly trumpet, from afar,
Had rouz'd the neighing ſteeds to ſcour the fields,
While the fierce riders *clatter'd* on their ſhields. *Dryden.*

2. To utter a noiſe by being ſtruck together.—All that night was heard an unwonted *clattering* of weapons, and of men running to and fro. *Knolles.*

3. To talk faſt and idly.—

Here is a great deal of good matter
Loſt for lack of telling;
Now, ſiker, I ſee thou doſt but *clatter*;
Herm may come of melling. *Spenſer.*

—All thoſe airy ſpeculations, which bettered not men's manners, were only a noiſe and *clattering* of words. *Decay of Piety.*

CLATWORTHY, a village in Somerſetſhire, between Bridgewater and Dulverton.

CLAVARIA, CLUB-TOP, in botany, a genus belonging to the cryptogamia claſs of plants, and of the order of fungi; the 58th in the natural method. The fungus is ſmooth and oblong. Mr Miller aſſerts, that the whole genus of clavaria belongs to the tribe of *zoophytes*, that is, to the animal, and not to the vegetable kingdom. According to his method, he ranks them among the Vermes, under a ſubdiviſion which he terms *Fungoſa oſculis atomiferis*; ſuppoſing them to be compound animals with many orifices on their ſurface, from which are protruded atoms or animalcules, which have a viſible ſpontaneous motion, ſomething ſimilar to what is now acknowledged to be a fact, with regard to a numerous claſs of marine bodies, termed CORALLINES. This motion, however, has not been obſerved by other naturaliſts. Schœffer has figured the ſeeds of ſeveral clavariæ as they appeared to him through the microſcope; and none of theſe fungi, when burnt, emit the ſtrong diſagreeable ſmell peculiar to animal ſubſtances.

1. CLAVARIA HEMOTADES, or the oak leather club-top, exactly reſembles tanned leather, except that it is thinner and ſofter. It is of no determinate form. It grows in the clefts and hollows of old oaks, and ſometimes on aſh in Ireland and in ſome places of England, &c. In Ireland it is uſed to dreſs ulcers, and in Virginia to ſpread plaſters upon, inſtead of leather.

2. CLAVARIA MILITARIS, and one or two other ſpecies, are remarkable for growing only on the head of a dead inſect in the nympha ſtate.

CLAVARIUM, in antiquity, an allowance the Roman ſoldiers had for furniſhing nails to ſecure their ſhoes with. They raiſed frequent mutinies, demanding largeſſes of the emperors under this pretence.

CLAVATA VESTIMENTA, in intiquity, habits adorned with purple clavi, which were either broad or narrow. See CLAVUS.

* CLAVATED. *adj.* [*clavatus*, Lat.] Knobbed; ſet with knobs.—Theſe appear plainly to have been *clavated* ſpikes of ſome kind of echinus ovarius. *Woodward.*

CLAUBERGE, John, a learned profeſſor of philoſophy and divinity at Duiſburg, born at Solingen in 1622. He travelled into Holland, France, and England, and in each country obtained the eſteem of the learned. The elector of Brandenburg gave him public teſtimonies of his eſteem. He died in 1665. His works were printed at Amſterdam in 2 vols 4to. His beſt treatiſe, is his *Logica vetus et nova*, &c.

CLAUDA, a ſmall iſland near Crete, which Paul and his company paſſed, in their voyage to Rome. Acts xxvii. 16. It is now called Gozzo.

(1.) CLAUDE, John, a French Proteſtant divine, born in the province of Angenois, in 1690. Meſſ. de Port Royal uſing their utmoſt endeavours to convert M. de Turenne to the catholic faith, preſented him with a piece calculated to that end, which his lady engaged Mr Claude to anſwer; and his performance gave riſe to the moſt famous controverſy that was ever carried on in France between the Roman Catholics and Proteſtants. On the revocation of the edict of Nantz, he retired to Holland, where he met with a kind reception, and was honoured with a conſiderable penſion by the prince of Orange. He died in 1687; and left a ſon Iſaac Claude, whom he lived to ſee miniſter of the Walloon church at the Hague, and who publiſhed ſeveral excellent works of his deceaſed father.

(2.) Claude of Lorrain, or Claude Gelee, a celebrated landſcape painter, and a ſtriking example of the efficacy of induſtry to ſupply, or call forth, genius. Claude was born in 1600; and being dull at ſchool was put apprentice to a paſtry-cook; he afterwards rambled to Rome to ſeek a livelyhood; but being very ill bred, and unacquainted with the language, nobody employed him. At laſt he fell in with Agoſtino Traſſo, who hired him to grind his colours, and to do all his houſehold drudgery. Traſſo hoping to make him ſerviceable in ſome of his greateſt works, taught him by degrees the rules of perſpective and the elements of deſign. Claude at firſt did not know what to make of thoſe principles of art; but being encouraged, and not failing in application, he came at length to underſtand them. Then his ſoul enlarged, and he cultivated the art with eagerneſs. He exerted his utmoſt induſtry to explore the true principles of painting, by an inceſſant examination of nature; for which purpoſe, he ſtudied in the open fields; where he often continued from ſun-riſe till the duſk of the evening compelled him to withdraw. It was his cuſtom to ſketch whatever he thought beautiful or ſtriking; and every curious tinge of light: on all kinds of objects, he marked in his ſketches with a ſimilar colour; from which he perfected his landſcapes with ſuch a look of real nature, and gave them ſuch an appearance of truth, as proved ſuperior to any artiſt that ever painted in that ſtyle. Sandrat relates, that Claude uſed to explain to him, as they walked through the fields, the cauſes of the different appearance of the ſame proſpect at different hours of the day, from the reflections or refractions of light, from dews or vapours, in the evening or morning, with all the preciſion of a philoſopher. Whatever ſtruck his imagination, while he obſerved nature abroad, it was ſo ſtrongly impreſſed on his memory, that on his return to his work he never failed to make the happieſt uſe of it. His ſkies are full of luſtre, and every object is properly illumined. His diſtances are admirable, and in every part there is a delightful union and harmony. His invention is pleaſing, his colouring delicate, and his tints have ſuch an agreeable ſweetneſs and variety, as have been but imperfectly imitated by the beſt ſubſequent artiſts, but were never excelled. He gave an uncommon tenderneſs to his finiſhed trees by glazing; and in his large compoſitions which he painted in freſco, he was ſo exact that the diſtinct ſpecies of every tree might readily be diſtinguiſhed. As to his figures, when he painted them himſelf, they were very indifferent; and he was ſo conſcious of his deficiency in this reſpect, that he uſually engaged other artiſts who were eminent to paint them for him particularly Courtois and Philip Laura. His pictures are now very rare, eſpecially ſuch as are undamaged; no price is thought ſuperior to their merit. To avoid a repetition of the ſame ſubject, and to detect ſuch copies of his works as might be injurious to his fame, by being ſold for originals, it was his cuſtom to draw, in a paper book, the deſigns of all thoſe pictures which were tranſmitted to different countries; and on the back of the drawings, he wrote the name of the perſon who had been the purchaſer. That book which he titled *Libro de Verita*, is now in the poſſeſſion of the duke of Devonſhire.

(3.) Claude, St, a town of France, in the department of Jura, and ci-devant province of Franche Compte, ſeated among the mountains on the river Liſſon. In this town, there are many public fountains with large baſins. It is 35 miles NW. of Geneva. Lon. 6. 18. E. Lat. 46. 24. N.

(4.) Claude, St, a high mountain of France, in the department of Jura. It forms a part of mount Jura, and affords a fine proſpect of Switzerland and Mount Blanc, the lake and town of Geneva, and the Paye du Vaud.

* CLAUDENT. *adj.* [*claudens*, Lat.] Shutting; incloſing; confiſting. *Dict.*

(1.) CLAUDIA, a veſtal virgin at Rome, who being ſuſpected of unchaſtity, is ſaid to have been cleared from that imputation in the following manner: the image of Cybele being brought out of Phyrgia to Rome in a barge, and it happening to ſtick ſo faſt in the river Tyber that it could not be moved, ſhe tying her girdle, the badge of chaſtity, to the barge, drew it along to the city, which a thouſand men were not able to do.

(2.) Claudia Aqua, or Aqua Appia, water conveyed to Rome by a canal or aqueduct of 11 miles in length, the contrivance of Appius Claudius the cenſor, and the firſt ſtructure of the kind in the year of Rome 441.

(3.) Claudia Copia, a name of *Lugdunum*, or Lyons in France; the birth-place of the emperor Claudius. It was a Roman colony, and called *Claudia*, from its benefactor the emperor; and *Copia*, from its plenty of all neceſſaries, eſpecially corn. See Lugdunum.

(4.) Claudia Lex, the Claudian law, in antiquity. Of theſe there were ſeveral ſuch as, i. *De Comitiis*, enacted by M. Claudius Marcellus, A. U. C. 702. It ordained, that at public elections of magiſtrates no notice ſhould be taken of the votes of ſuch as were abſent. ii. *De Usura*, which forbade people to lend money to minors on condition of payment, after the deceaſe of their parents. iii. *De Negotiatione*, by Q. Claudius the tribune, 535. It forbade any ſenator, or father of a ſenator, to have any veſſel containing above 300 amphoræ, for fear of their engaging themſelves in commercial ſchemes. It alſo prohibited the ſame thing to the ſcribes and the attendants of of the queſtors, as it was naturally ſuppoſed that people, who had any commercial connections, could not be faithful to their truſt nor promote the intereſt of the ſtate. iv. A law enacted A.U.C. 576, to permit the allies to return to their reſpective cities, after their names were inrolled. Liv. 41 c. 9. v. Another to take away the freedom of the city of Rome from the coloniſts which Cæſar had carried to Novicomum.

(5.) Claudia Via, or Clodia Via, a road of ancient Rome, which, beginning at the Pons Milvius, joined the Flaminia, paſſing through Etruria, on the S. ſide of the Lacus Sebantinus, and ſtriking off from the Caſſia, and leading to Lucca: large remains of it are to be ſeen above Bracciano.

CLAUDIANUS, Claudius, a Latin poet, who flouriſhed in the 4th century, under Theodoſius, Arcadius and Honorius. He came to Rome A. D. 395, when he was about 30 years old; and inſinuated himſelf into Stilicho's favour; who being a perſon of great abilities both for civil and military affairs, though a Goth by birth, was ſo conſiderable a perſon under Honorius that he may be ſaid for many years to have governed the weſtern empire. Stilicho afterwards fell into diſgrace and was put to death; and it is ſuppoſed that the poet was involved in the misfortunes of his patron; but he roſe afterwards to great favour; and obtained ſeveral honours both civil and military. The princeſs Serena had a great eſteem for Claudian, and recommened him to a lady of great quality and fortune in Libia, whom he married. There are a few little poems on ſacred ſubjects, which have been aſcribed by ſome critics to Claudian; and ſo have made him be thought a Chriſtian. But St Auſtin, who was cotemporary with him, expreſsly ſays that he was a Heathen. Claudian's ſtyle is thought by critics to reſemble that of Virgil.

* *To* CLAUDICATE. *v. n.* [*claudico*, Lat.] To halt; to limp. *Dict.*

* CLAUDICATION. *n. ſ.* [from *claudicate.*] The act or habit of halting. *Dict.*

(1.) CLAUDIUS, Appius, a Sabine by birth, one of the principal inhabitants of Regillum. His merit having drawn the envy of his fellow citizens upon him, he retired to Rome with all his family. He was admitted into the ſenate, and was made conſul, with Publius Servillius Priſcus, A. U. C. 258: but he was hated by the Plebeians, being an auſtere oppoſer of their clamours and ſeditions. The Claudian family continued long one of the moſt illuſtrious of the partrician families in Rome; and ſeveral in ſucceſſion of the name of Appius ſupported the ſame ſtern ariſtocratic character, that diſtinguiſhed their firſt founder.

(2.) Claudius, Caius. See Carthage, § 5.

(3.) Claudius I. emperor of Rome A. D. 42. The beginning of his reign was very promiſing; but it was ſoon diſcovered that little better than an ideot filled the throne, who might eaſily be made a tyrant: Accordingly he became a very cruel one, through the influence of his empreſs, the infamous Meſſalina: After her death, he married his niece Agrippina, who cauſed him to be poiſoned, to make way for Nero, A. D. 54. See Rome history of.

(4.) Claudius II. Flavius, ſurnamed Gothicus, ſignalized himſelf by his courage and prudence under Valerian and Galienus; and on the death of the latter was declared emperor, A. D. 268. He put to death Aureolus, the murderer of Galienus; defeated the Germans; and in 296 marched againſt the Goths, who ravaged the empire with an army of 300,000 men, which he at firſt haraſſed, and the next year entirely defeated: but a contagious diſeaſe, which had ſpread through that vaſt army, was caught by the Romans; and the emperor himſelf died of it a ſhort time after, aged 56. Pollio ſays that this prince had the moderation of Auguſtus, the virtue of Trajan, and the piety of Antoninus. See Rome.

* CLAVE. [the preterite of *cleave.*] See Cleave.

CLAVEL, a town near Horton, Devonſhire.

* CLAVELLATED. *adj.* [*clavellatus*, low Latin.] Made with burnt tartar. A chymical term. *Chambers.*—Air, tranſmitted through *clavellated* aſhes into an exhauſted receiver, loſes weight as it paſſes through them. *Arbuthnot.*

CLAVENNA, or Chiavenna. See Chiavenna.

* CLAVER. *n. ſ.* [*clæfer wyrt*, Sax.] This is now univerſally written *clover*, though not ſo properly. See Clover.

(1.) CLAVERACK, a town of New York, the capital of Columbra county, pleaſantly ſeated on a large plain about 2½ miles E. of Hudſon city, near the creek, (N° 2.) It has a Dutch church, and a court-houſe, in which courts of common pleas and general ſeſſions are held quarterly.

(2.) Claverack, a creek, or rivulet in New York.

CLAVERDON, a town near Henley, Warwickſhire.

CLAVERHAM, two villages; 1. in Yatton pariſh, Somerſetſhire: 2. SW. of Haylſham, Suſſex.

CLAVERING, near Saffron-waldon, Eſſex.

CLAVERLEY, two towns in Shropſhire; viz. 1. NE. of Bridge-north: 2. SE. of Whitchurch.

CLAVERTON, in Somerſetſhire, near Bath.

CLAVES insulæ, a term uſed in the iſle of Man; where all weighty and ambiguous cauſes are referred to a jury of twelve, who are called *claves inſulæ*, the keys of the iſland.

CLAUFORD, a village in Somerſetſhire, near Frome Selwood.

CLAUGHTON, a town NE. of Lancaſter.

CLAVICHORD, and } two muſical inſtru-
CLAVICITHERIUM, } ments uſed in the 16th century. They were of the nature of the ſpinet, but of an oblong figure. The firſt is ſtill uſed by the nuns in convents; and that the practitioners may not diſturb the ſiſters in the dormitory, the ſtrings are muffled with ſmall bits of fine woollen cloth.

* CLAVICLE. *n. ſ.* [*clavicula*, Lat.] The collar bone.—Some quadrupeds can bring their fore feet unto their mouths; as moſt that have *clavicles*, or collar bones. *Brown.*—A girl was brought with angry wheals down her neck, towards the *clavicle*. *Wiſeman.*

CLAVICYMBALUM, in antiquity, a muſical inſtrument with 30 ſtrings. Modern writers apply the name to our harpſichords.

CLAVIJO, a village of Spain, in Old Caſtile, remarkable for a victory obtained by King Ramira over the Moors; two leagues from Logronno.

CLAVIS, [Lat.] properly ſignifies a key; and is ſometimes uſed in Engliſh to denote an explanation of ſome obſcure paſſages of any book or writing.

CLAVI vestium, were flowers or ſtuds of purple interwoven with, or ſewed upon the garments of knights or ſenators: only, for diſtinction, the former uſed them narrow, the latter broad.

CLAVIUS, Chriſtopher, a German Jeſuit born at Bamberg, who excelled in the knowledge of the mathematics, and was one of the chief perſons employed to rectify the kalendar; the defence of which he alſo undertook againſt thoſe who cenſured it, eſpecially Scaliger. He died at Rome in 1618, aged 75. His works have been printed in 5 volumes folio; the principal of which is his commentary on Euclid's Elements.

CLAVO, a town of Corſica, 8 miles SE. of Ajaccio.

CLAUS, a town of Germany, in Bregentz, 1 mile NE. of Bregentz.

* CLAUSE. *n. ſ.* [*clauſula*, Lat.] 1. A ſentence; a ſingle part of a diſcourſe; a ſubdiviſion of a larger ſentence; ſo much of a ſentence as is to be conſtrued together.—God may be glorified by obedience, and obeyed by performance of his will, although no ſpecial *clauſe* or ſentence of ſcripture be in every ſuch action ſet before men's eyes to warrant it. *Hooker.* 2. An article, or particular ſtipulation.—The *clauſe* is untrue concerning the biſhop. *Hooker.*—When, after his death, they were ſent both to Jews and Gentiles, we find not this *clauſe* in their commiſſion. *South.*

(1.) CLAUSEN, a town of France, in the department of the Sarre and Moſelle, late of Germany, in the circle of the Lower Rhine, and electorate of Treves, 5 miles S. of Wittick.

(2.) CLAUSEN, a town of Germany in the Tiroleſe, 6 miles SW. of Brixen.

CLAUSENBURG, a large and populous city of Tranſylvania, ſituated on the river Samos. Lon. 20. 50. E. Lat. 47. 10. N.

CLAUSENTUM, the ancient name of SOUTHAMPTON.

CLAUSTHAL, a town of Germany, in the circle of Lower Saxony, and principality of Grubenhagen, containing 800 houſes. There are two churches, a houſe of orphans, a public ſchool, a ſmall garriſon, and a mint for coining money. Near it are ſilver mines. It is 15 m. S. of Goſlar.

* CLAUSTRAL. *adj.* [from *clauſtrum*, Lat.] Relating to a cloyſter, or religious houſe.—*Clauſtral* priors are ſuch as preſide over monaſteries, next to the abbot or chief governour in ſuch religious houſes. *Ayliffe.*

* CLAUSURE. *n. ſ.* [*clauſura*, Lat.] Confinement; the act of ſhutting; the ſtate of being ſhut.—In ſome monaſteries the ſeverity of the *clauſure* is hard to be born. *Geddes.*

CLAUSWORTH, a village in Somerſetſhire, near Hardington.

CLAUSZ, a town of Germany, in the archduchy of Auſtria, 17 miles SSW. of Steyr.

CLAUSZNITZ, a town of Germany, in the circle of Upper Saxony, and circle of Erzgebirg, 14 miles SSE. of Freyberg.

(1.) CLAVUS, in antiquity, an ornament upon the robes of the Roman ſenators and knights; which was more or leſs broad, according to the dignity of the perſon: hence the diſtinction of *tunica anguſti-clavia* and *laticlavia*.

(2.) CLAVUS ANNALIS, in antiquity, the nail annually fixed by the Romans to mark their years. So rude and ignorant were the Romans in the beginning of their ſtate, that the driving a nail was the only method they had of keeping a regiſter of time. There was an ancient law, ordaining the chief prætor to fix a nail every year on the Ides of September; it was driven into the right ſide of the temple of Jupiter Opt. Max. towards Minerva's temple. The Etrurians uſed likewiſe to drive nails into the temple of their goddeſs Nortia with the ſame view.

(3.) CLAVUS, in medicine and ſurgery, is uſed in ſeveral ſignifications: 1. An indurated tubercle of the uterus: 2. A chirurgical inſtrument of gold, mentioned by Amatus Luſitanus, deſigned to be introduced into an exulcerated palate, for the better articulation of the voice: 3. A corn on the foot. See § 4, & 5.

(4.) CLAVUS HYSTERICUS is a ſhooting pain in the head, between the pericranium and cranium, which affect women who are troubled with hyſterics.

(5.) CLAVUS OCULORUM, according to Celſus, is a callous tubercle on the white of the eye, taking its denomination from its figure.

(1.) * *A* CLAW. *n. ſ.* [*clawan*, Saxon.] 1. The foot of a beaſt or bird, armed with ſharp nails; or the pincers or holders of a ſhell-fiſh.—

I ſaw her range abroad to ſeek her food,
T'embrue her teeth and *claws* with lukewarm
blood. *Spenſer.*
What's juſtice to a man, or laws,
That never comes within their *claws*? *Hudib.*

2. Sometimes a hand, in contempt.

(2.) CLAW, among zoologiſts, implies only the ſharp-pointed nail of a bird or quadruped, not the whole foot.

* *To* CLAW. *v. a.* [*clawan*, Saxon.] 1. To tear with nails or claws.—Look, if the wither'd elder hath not his poll *claw'd* like a parrot. *Shak.* 2. To pull, as with the nails.—I am afraid we ſhall not eaſily *claw* off that name. *South.* 3. To tear or ſcratch in general.—

But we muſt *claw* ourſelves with ſhameful
And heathen ſtripes, by their example. *Hudib.*
They for their own opinions ſtand faſt,
Only to have them *claw'd* and canvaſt *Hudib.*

4. To ſcratch or tickle.—I muſt laugh when I am merry, and *claw* no man in his humour. *Shakeſp.* 5. To flatter; an obſolete ſenſe. See CLAWBACK. 6. *To* CLAW *off*, or *away*. To ſcold; to rail at.—You thank the place where you found money; but the jade Fortune is to be *clawed away* for't, if you ſhould looſe it. *L'Eſtrange.*

* CLAWBACK. *n. ſ.* [from *claw* and *back.*] A flatterer; a ſycophant; a wheedler.—The pope's *clawbacks*. *Jewel.*

CLAWDOCK, a river of N. Wales in Denbighſhire, which runs into the Cluyd, 4 miles N. of Ruthin.

* CLAWED. *adj.* [from *claw*.] Furniſhed or armed with claws.—Among quadrupeds, of all the *clawed*, the lion is the ſtrongeſt. *Grew.*

CLAWGHTON HALL, a village near Garſtang, Lancaſhire.

CLAWORTH, a town in Nottinghamſhire.

CLAWSTON, LONG, a village in Leiceſterſhire, near Nether Broughton.

CLAWTON, near Houlſworthy, Devonſh.

CLAXBY, the name of 3 villages in Lincolnſh.

viz. 1. S. of Alford: 2. W. of Bulingbroke; and 3. near Market-raiſin.

(1.) CLAXTON, in Durham, near Grethain.

(2.) CLAXTON, in Norfolk, on the Yare, near Thurſton. It has a fair at midſummer for 5 days.

(I. 1.) * CLAY. *n. ſ.* [*clai*, Welch; *kley*, Dutch.] 1. Unctuous and tenacious earth, ſuch as will mould into a certain form.—*Clays* are earths firmly coherent, weighty and compact, ſtiff, viſcid, and ductile to a great degree, while moiſt; ſmooth to the touch, not eaſily breaking between the fingers, nor readily diffuſible in water; and, when mixed, not readily ſubſiding from it. *Hill.*—Expoſe the *clay* to the rain, to drain it from ſalts, that the bricks may be more durable. *Woodward.*—The ſun, which ſoftens wax, will harden *clay*. *Watts.*—Clover is the beſt way of improving *clays*, where manure is ſcarce. *Mortimer.* 2. [In poetry.] Earth in general; the terreſtrial element.—

Why ſhould our *clay*,
Over our ſpirits ſo much ſway? *Donne.*

(2.) CLAY, in natural hiſtory, is a kind of earth to which chemiſts formerly gave the name of ARGILLA, or ARGILLACEOUS EARTH, but which in the new chemical nomenclature, is called *alumine*. See CHEMISTRY.

(3.) CLAYS may be eaſily diffuſed and ſuſpended in water, but are not ſoluble in any ſenſible degree. The ſudden application of ſtrong heat hardens their external parts, which afterwards burſt by the exploſion of the moiſture within. By a more gradual heat pure clay contracts very much, becomes hard, and full of cracks [illegible] fiſſures. The preſence of ſiliceous earth in common clays, where it uſually conſtitutes above half the weight, renders the contraction more uniform throughout, and prevents the cracks; probably in no other way than by rendering them more numerous, and too ſmall to be perceived. When thus baked, it conſtitutes all the varieties of bricks, pottery, and porcelain. Theſe, if baked in a ſtrong heat, give fire with ſteel; a property that may be attributed to the ſiliceous earth they contain, which cannot act on the ſteel unleſs firmly ſet in the hardened clay. Baked clay is no longer kneadable with water, though as finely pulverized as mechanical means can go. Hence it has been inferred, that clays owe their ductility to a kind of gluten, which is ſuppoſed to be diſſipated by heat. They recover that property, however, by a ſolution in an acid and precipitation; whence it ſhould ſeem to depend either on a minute portion of acid contained in clays, or the ſmallneſs of the particles when precipitated.

(4.) CLAYS, PRINCIPAL SPECIES OF. See CHEMISTRY, and MINERALOGY.

(5.) CLAYS, USES OF. Clays are of very extenſive uſe. Some varieties of the porcelain clay become perfectly white in the fire; and it is not to be doubted but theſe are uſed in the porcelain manufactories. The indurated porcelain clay, however, cannot be eaſily heated without cracking; and therefore we can go no great length in hardening it. The boles have loſt their value as medicines; but are ſtill employed to make bricks, potter's ware, &c. Tripoli is of indiſpenſable uſe in poliſhing, and is likewiſe, on many occaſions, uſed for making moulds to caſt metals in. In agriculture, clay is indiſpenſably neceſſary; excepting, however, according to Cronſtedt, the white and fermenting clays above mentioned, for which no uſe has yet been diſcovered. By its coherence, clay retains humidity; on which perhaps its chief power of promoting vegetation depends. Dr Black obſerves, that clay, when mixed with a large proportion of water, and kneaded a little, becomes a remarkable ductile adheſive maſs, which is not eaſily diſſolved in more water, and to render it thin and fluid requires great trouble. Hence it is employed for confining large quantities of water, as in making canals and dykes: but the ſoil muſt either contain a great quantity of clay naturally, or ſome quantity of it muſt be ſpread on the bottom; or the water itſelf muſt depoſit a quantity of clay ſufficient to render it tight. Hence alſo we ſee the bad effects of allowing cattle to tread much on clay grounds when wet; for the clay is reduced to ſuch an adheſive maſs as not to admit the roots to penetrate the ſoil, or the water to enter to the roots. Clay is uſed in the refining of ſugar; for which no other property is requiſite than that it may not dry too ſoon; but that ſpecies uſed in fulling muſt, if we were to judge *à priori*, beſides the fineneſs of its particles, be of a dry nature, or ſuch as attracts oils; though this quality perhaps may not be found in all thoſe clays that are now employed in the buſineſs. According to Fabroni, the pure white clay being calcined in a ſtrong heat, acquires a phoſphoreſcent quality.

(II. 1.) CLAY, in geography, a lake of Ireland, in the county of Armagh, 7 m. S. of Armagh.

(2.) CLAY, a town of England, on the N. coaſt of Norfolkſhire, with a ſmall harbour, and extenſive ſalt works. It is ſeated on an arm of the ſea, between two rivers: 8 miles from Walſingham 20 NW. of Norwich, and 28 ENE. of Lynn. Lon. 23. 20. E. Lat. 52. 2. N.

* *To* CLAY. *v. a.* [from the noun.] To cover with clay; to manure with clay.—This manuring laſts 50 years: then the ground muſt be *clayed* again. *Mortimer.*

CLAYBURY, a town in Eſſex, between Wanſtead and Rumford.

CLAY-COCLE, in Norfolkſh. S. of Swaffham.

* CLAY-COLD. *adj.* [*clay* and *cold*.] Lifeleſs; cold as the unanimated earth.—

I waſh'd his *clay-cold* corſe with holy drops,
And ſaw him laid in hallow'd ground. *Rowe.*

CLAY-COTON, a village in Northamptonſhire, S. of Daventry.

CLAYDON, EAST,
CLAYDON, MIDDLE,
CLAYDON, STEEPLE,
} Three villages in the county of Buckingham, W. of Winſlow.

CLAYE, a town of France, in the department of Seine and Loire, 7½ miles W. of Meaux, and 15 E. of Paris.

* CLAYES. *n. ſ.* [*claye*, Fr. In fortification.] Wattlers made with ſtakes interwoven with oſiers to cover lodgments. *Chambers.*

CLAYETTE, a town of France, in the department of Saone and Loire, and chief place of a canton, in the diſtrict of Marcigny, 10½ miles NE. of Marcigny.

* CLAYEY. *adj.* [from *clay*.] Conſiſting of

clay; abounding with clay.—Some in a lax or ſandy, ſome a heavy or *clayey* ſoil. *Derham.*

Clay-Hanger, a village in Devonſhire, N. of Aſhbridge.

Clay-Haydon, a town in Devonſhire, near Church Stempton.

Clay-Hill, 3 Engliſh villages; 1. in Middleſex, near Enfield-Chace: 2. in Wilts, near Warminſter: 3. in Shropſhire, on the N. bank of the river Temde; called alſo Brown-clee hill.

Clay-Hole, a village of Scotland in Wigtonſhire, in the pariſh of Lochſwalt, near Stranraer; containing, along with the adjacent village of Hill head, about 500 inhabitants.

* **CLAYISH.** *adj.* [from *clay.*] Partaking of the nature of clay; containing particles of clay.—Small beer proves an unwholeſome drink; perhaps, by being brewed with a thick, muddiſh, and *clayiſh* water, which the brewers covet. *Harvey.*

Clay lands, thoſe abounding with clay, whether black, blue, yellow, white, &c. of which the black and the yellow are the beſt for corn. See Husbandry, *Index.*

* **CLAYMARL.** *n. ſ.* [*clay* and *marl.*] A whitiſh, ſmooth, chalky clay.—*Claymarl* reſembles clay, and is near a kin to it: but is more fat, and ſometimes mixed with chalk-ſtones. *Mortimer.*

* **Clay-pit.** *n. ſ.* [*clay* and *pit.*] A pit where clay is dug —'Twas found in a *clay pit. Woodward.*

Clay Pool, a village S. of Buckingham, Lincolnſhire.

Clay-Thorp, E. of Burnwell, Lincolnſhire.

(1.) **CLAYTON**, Dr Robert, a prelate of great learning and probity, and a reſpectable member of the Royal and Antiquarian Societies at London, was advanced to the biſhopric of Killala, Jan. 23, 1729; tranſlated to the ſee of Cork, Dec. 19, 1735; to that of Clogher, Aug. 26, 1745; and died much lamented, Feb. 25, 1758. His publications are, 1. A Letter in the *Philoſ Tranſ.* N° 461, p. 813, giving an account of a Frenchman 70 years old, (at Inithanan, in his dioceſe of Cork,) who gave ſuck to a child.—2. The Chronology of the Hebrew Bible vindicated, &c. 1751, 4to—3. An Impartial Inquiry into the Time of the Coming of the Meſſiah; 1751, 8vo —4. An Eſſay on Spirit, 1751, 8vo.—5. A vindication of the Hiſtories of the Old and New Teſtament, in Anſwer to the Objections of the late Lord Bolingbroke, 1752, 8vo. reprinted in 1753.—6. A defence of the Eſſay on Spirit, with Remarks on the ſeveral pretended Anſwers; and which may ſerve as an Antidote againſt all that ſhall ever appear againſt it, 1753, 8vo.—7. A Journal from Grand Cairo to Mount Sinai, and back again, tranſlated from a MS. written by the Prefetto of Egypt, in Company with ſome miſſionaries *de propaganda fide* at Grand Cairo; to which are added, Remarks on the Origin of Hieroglyphics, and the Mythology of the ancient Heathens, 1753. 4to. and 8vo.—8. Some thoughts on Self love, Innate Ideas, Freewill, Taſte, Sentiments, Liberty, and Neceſſity, &c. occaſioned by reading Mr Hume's Works, and the ſhort Treatiſe written in French by Lord Bollingbroke on Compaſſion, 1754, 8vo.—9. A Vindication of the Hiſtories of the Old and New Teſtament, Part II. 1754, 8vo.—10. Letters between the biſhop of Clogher and Mr William Penn, concerning Baptiſm, 1755, 8vo.—11. A Speech made in the Houſe of Lords in Ireland, on Monday Feb. 2, 1756, for omitting the Nicene and Athanaſian Creeds out of the Liturgy, &c. 1756, 8vo.—12. A Vindication. Part III. 1758, 8vo. The three parts of the "Vindication, with the Eſſay on Spirit, were reprinted by Mr Bowyer, in one vol. 8vo. 1759, with notes and an index.

(2, 3.) **Clayton**, two villages in Yorkſhire: 1. E. of Byerley Park; 2. SW. of Bradford.

(4.) **Clayton-cum-Kimer**, NW. of Lewes, Suſſolk.

(5.) **Clayton-Hall**, NW. of Chorley, Lancaſhire.

CLAYTONIA, in botany, a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 13th order, *Succulentæ*: The calyx is bivalved; the corolla pentapetalous; the ſtigma trifid; the capſule trivalved, unilocular, and triſpermous. There are two ſpecies, natives of America. They are very low herbaceous plants, with white flowers; and are poſſeſſed of no remarkable property.

CLAZOMENA, or **CLAZOMENÆ**, one of the 12 ancient cities of Ionia, ſituated near Colophon. The city was ſmall, its port on the NNW. ſide of the iſland. Traces of the walls are found by the ſea; and in a hill are veſtiges of a theatre. Three or four trees grow on it; and by one is a cave hewn in the rock, affording water. A vaulted room with a chimney at one end, and a hovel or two made with ſtones piled, are all the preſent ſtructures; and theſe are chiefly frequented by fiſhermen, and by perſons employed to drive away birds when the grain ripens. Clazomenæ was the birth place of Anaxagoras.

CLEADER, a town E. of Camelford, Cornwall.

CLEAGATE, W. of Ewell, Surry.

(1.) * **CLEAN.** *adj.* [*glan*, Welſh; *clæne*, Sax.] 1. Free from dirt and filth; as, *clean* water.—

Both his hands, moſt filthy feculent,
Above the water were on high extent,
And fain'd to waſh themſelves inceſſantly;
Yet nothing *cleaner* were for ſuch intents
But rather fouler. *Fairy Queen.*

—They make *clean* the outſide of the cup and of the platter, but within they are full of extortion and exceſs. *Matthew.* 2. Free from moral impurity; chaſte; innocent; guiltleſs. 3. Elegant; neat: not unwieldy; not encumbered with any thing uſeleſs or diſproportioned.—The timber and wood are in ſome trees more *clean*, in ſome more knotty. *Bacon.*—

Yet thy waiſt is ſtrait and *clean*,
As Cupid's ſhaft, or Herme's rod. *Waller.*

4. Not foul with any loathſome diſeaſe; not leprous—If the plague be ſomewhat dark, and ſpread not in the ſkin, the prieſt ſhall pronounce him *clean. Leviticus.* 5. Dextrous; not bungling; feat; as a *clean* trick; a *clean* leap; a *clean* boxer.

(2.) * **Clean.** *adv.* 1. Quite; perfect; fully; completely. This ſenſe is now little uſed.—Their actions have been *clean* contrary unto thoſe before mentioned. *Hooker.*—

Being ſeated, and domeſtic broils
Clean overblown. *Shakeſpeare.*

2. W

2. Without miſcarriage; in a dexterous manner.—

Pope came off *clean* with Homer, but they ſay,
Broome went before and kindly ſwept the way.
Henley.

* *To* CLEAN. *v. a.* [from the adjective.] To free from dirt or filth.—

Their tribes adjuſted, *clean'd* their vig'rous wings,
And many a circle, many a ſhort eſſay,
Wheel'd round and round. *Thomſon.*

* CLEANLILY. *adv.* [from *cleanly.*] In a cleanly manner.

* CLEANLINESS. *n. ſ.* [from *cleanly.*] 1. Freedom from dirt or filth.—I ſhall ſpeak nothing of the extent of this city, the *cleanlineſs* of its ſtreets, nor the beauties of its piazza. *Addiſon.* 2. Neatneſs of dreſs; purity; the quality contrary to negligence and naſtineſs.—The miſtreſs thought it either not to deſerve, or not to need any exquiſite decking, having no adorning but *cleanlineſs.* *Sidn.*

Such *cleanlineſs* from head to heel;
No humours groſs, or frowzy ſteams,
No noiſome whiffs, or ſweaty ſtreams. *Swift.*

(1.) * CLEANLY. *adj.* [from *clean.*] 1. Free from dirtineſs; careful to avoid filth; pure in the perſon.—

Next that ſhall mountain 'ſparagus be laid,
Pull'd by ſome plain but *cleanly* country maid.
Dryden.

—An ant is a very *cleanly* inſect, and throws out of her neſt all the ſmall remains of the corn on which ſhe feeds. *Addiſon.* 2. That which makes cleanlineſs.—

In our fantaſtick climes, the fair
With *cleanly* powder dry their hair. *Prior.*

3. Pure; innocent; immaculate.—Perhaps human nature meets few more ſweetly reliſhing and *cleanly* joys, than thoſe that derive from ſucceſsful trials. *Glanville.* 4. Nice; addreſsful; artful.—

Thro' his fine handling and his *cleanly* play,
All thoſe royal ſigns had ſtole away. *Spenſer.*

—We can ſecure ourſelves a retreat by ſome *cleanly* evaſion. *L'Eſtrange.*

(2.) * CLEANLY. *adv.* [from *clean.*] Elegantly; neatly; without naſtineſs.—If I do grow great, I'll leave ſack, and live *cleanly* as a nobleman ſhould. *Shakeſpeare's Henry* IV.

CLEAN-LOUGH, a lake of Ireland, in Leitrim county, 10 miles ESE. of Sligo.

* CLEANNESS. *n. ſ.* [from *clean.*] 1. Neatneſs; freedom from filth. 2. Eaſy exactneſs; juſtneſs; natural, unlaboured correctneſs.—He ſhewed no ſtrength in ſhaking of his ſtaff; but the fine *cleanneſs* of bearing it was delightful. *Sidney.* —He minded only the clearneſs of his ſatyr, and the *cleanneſs* of expreſſion. *Dryden's Juvenal.* 3. Purity; innocence.—The *cleanneſs* and purity of one's mind is never better proved, than in diſcovering its own faults at firſt view. *Pope.*

* *To* CLEANSE. *v. a.* [*clænſian,* Sax.] 1. To free from filth or dirt, by waſhing or rubbing.—

Cleanſe the pale corps with a religious hand,
From the polluting weed and common ſand.
Prior.

2. To purify from guilt.—The blueneſs of a wound *cleanſeth* away evil. *Proverbs.*—

Not all her od'rous tears can *cleanſe* her crime,
The plant alone deforms the happy clime.
Dryden.

3. To free from noxious humours by purgation.—

Can'ſt thou not miniſter to a mind diſeas'd,
And with ſome ſweet oblivious antidote,
Cleanſe the ſtuff'd boſom of that perilous ſtuff
Which weighs upon the earth? *Shakeſpeare.*

—This oil, combined with its own ſalt and ſugar, makes it ſaponaceous and *cleanſing,* by which quality it often helps digeſtion, and excites appetite. *Arbuthnot.* 4. To free from leproſy.—Shew thyſelf to the prieſt, and offer for thy *cleanſing* thoſe things which Moſes commanded. *Mark* i. 44. 5. To ſcour; to rid of all offenſive things.—This river the Jews proffered the pope to *cleanſe,* ſo they might have what they found. *Addiſon.*

* *A* CLEANSER. *n. ſ.* [*clænſere,* Sax.] That which has the quality of evacuating any foul humours; or digeſting a ſore; a detergent.—If there happens an impoſthume, honey, and even honey of roſes, taken inwardly, is a good *cleanſer.* *Arb.*

CLEANTHES, a ſtoic philoſopher, a diſciple of Zeno, flouriſhed A. A. C. 240. He maintained himſelf in the day by working in the night; being queſtioned by the magiſtrates how he ſubſiſted, he brought a woman for whom he kneaded bread, and a gardener for whom he drew water; and refuſed a preſent from them. He compoſed ſeveral works, of which there are now only a few fragments remaining.

(1.) * CLEAR. *adj.* [*clair,* Fr. *klaer,* Dutch; *clarus,* Lat.] 1. Bright; tranſpicuous; pellucid; tranſparent; luminous; without opacity or cloudineſs; not nebulous; not opacous; not dark.—

The ſtream is ſo tranſparent, pure and *clear,*
That had the ſelf-enamour'd youth gaz'd here,
He but the bottom, not his face, had ſeen.
Denham.

2. Perſpicacious: ſharp.—

A tun about was ev'ry pillar there;
A poliſh'd mirror ſhone not half ſo *clear.*
Dryden's Fables.

3. Cheerful; not clouded with care or anger.—

Sternly he pronounc'd
The rigid interdiction, which reſounds
Yet dreadful in mine ear, tho' in my choice
Not to incur: but ſoon his *clear* aſpect
Return'd, and gracious purpoſe thus renew'd.
Milton.

4. Free from clouds; ſerene.—I will darken the earth in a *clear* day. *Amos.*

And the *clear* ſun on his wide watery glaſs,
Gaz'd hot. *Milton's Par. Loſt.*

5. Without mixture; pure; unmingled. 6. Perſpicuous; not obſcure: not hard to be underſtood not ambiguous.—We pretend to give a *clear* account how thunder and lightning is produced. *Temple.*—Many men reaſon exceedingly *clear* and rightly, who know not how to make a ſyllogiſm. *Locke.* 7. Indiſputable; evident; undeniable.—

Remain'd to our almighty foe
Clear victory; to our part loſs, and rout
Through all th' empyrean. *Milton's Par. Loſt.*

8. Apparent; manifeſt; not hid; not dark.—Unto God, who underſtandeth all their ſecret cogitations, they are *clear* and manifeſt. *Hooker.*—The pleaſure of right reaſoning is ſtill the greater,

by how much the conſequences are more *clear* and the chains of them more long. *Burnet's Theory.* 9. Quick to underſtand; prompt; acute.—

Mother of ſcience, now I feel thy power
Within me *clear*, not only to diſcern
Things in their cauſes, but to trace the ways,
Of higheſt agents, deem'd however wiſe. *Milt.*

10. Unſpotted; guiltleſs; irreproachable.—Tho' the peripatetick philoſophy has been moſt eminent in its way, yet other ſects have not been wholly *clear* of it. *Locke.*—

Stateſman, yet friend to truth, in ſoul ſincere,
In action faithful, and in honour *clear*. *Pope.*

11. Unprepoſſeſſed; not preoccupied; impartial.—Leucippe, of whom one look, in a *clear* judgment, would have been more acceptable than all her kindneſs, ſo prodigally beſtowed. *Sidney.* 12. Free from diſtreſs, proſecution, or imputed guilt.

The cruel corp'ral whiſper'd in my ear,
Five pounds, if rightly tipt would ſet me *clear*. *Gay.*

13. Free from deductions or incumberances.—Whatever a foreigner, who purchaſes land here, gives for it, is ſo much every farthing *clear* gain to the nation; for that money comes *clear* in, without carrying out any thing for it. *Locke.*—

I often wiſh'd that I had *clear*,
For life, ſix hundred pounds a-year. *Swift.*

14. Unincumbered; without let or hindrance; vacant; unobſtructed.—A poſt boy winding his horn at us, my companion gave him two or three curſes, and left the way *clear* for him *Addiſon.*—A *clear* ſtage is left for Jupiter to diſplay his omnipotence, and turn the feat of armies alone. *Pope.* 15. Out of debt. 16. Unintangled; at a ſafe diſtance from any danger or enemy.—Finding ourſelves too ſlow of ſail, we put on a compelled valour, and in the grapple I boarded them: on the inſtant they got *clear of* our ſhip. *Shakeſpeare.*—It required care for a man with a double deſign to keep *clear of* claſhing with his own reaſonings. *L'Eſtrange.* 17. Canorous; ſounding diſtinctly, plainly; articulately.—I much approved of my friend's inſiſting upon the qualifications of a good aſpect and a *clear* voice. *Addiſon.*

Hark! the numbers ſoft and *clear*,
Gently ſteal upon the ear,
Now louder and yet louder riſe,
And fill with ſpreading ſounds the ſkies. *Pope.*

18. Free; guiltleſs: with *from*.—I am *clear from* the blood of this woman. *Suſan.*—None is ſo fit to correct their faults, as he who is *clear from* any in his own writings. *Dryden.* 19. Sometimes with *of*.—The air is *clearer of* groſs and damp exhalations. *Temple.* 20 Uſed of perſons. Diſtinguiſhing; judicious; intelligible: this is ſcarcely uſed but in converſation.

(2.) * **Clear.** *adv.* 1. Plainly; not obſcurely.

Now *clear* I underſtand
What oft my ſteddieſt thoughts have ſearch'd
in vain. *Milton.*

2. Clean; quite; completely. A low word.—He put his mouth to her ear, and, under pretext of a whiſper, bit it *clear* off. *L'Eſtrange.*

(3.) * **Clear.** *n. ſ.* A term uſed by builders for the inſide of a houſe; the ſpace within from wall to wall.

(4.) **Clear**, as a naval term, is variouſly applied to the weather, the ſea coaſts, cordage, navigation, &c. The weather is ſaid to be clear when it is fair and open, as oppoſed to cloudy or foggy. The ſea coaſt is called clear when the navigation is not interrupted, or rendered dangerous by rocks, ſands, or breakers, &c. It is expreſſed of cordage, cables, &c. when they are unembarraſſed or diſentangled, ſo as to be ready for immediate ſervice. It is uſually oppoſed to FOUL in all theſe ſenſes.

(5.) **Clear, Cape**, a promontory of a ſmall iſland, on the S. of Ireland. The iſland is inhabited. Lon. 11. 10. W. Lat. 51. 18. N.

(6) **Clear, Cape**, another iſland of Ireland, with a promontory, near Baltimore Haven. It is inhabited.

(1.) * *To* **Clear.** *v. a.* [from the adjective.] 1. To make bright, by removing opacous bodies; to brighten.—

Your eyes that ſeem ſo clear,
Yet are but dim, ſhall perfectly be then
Open'd and *clear*. *Milton's Par Loſt.*
Like Boreas in his race, when ruſhing forth,
He ſweeps the ſkies, and *clears* the cloudy North.
Dryden.

2. To free from obſcurity, perplexity, or ambiguity.—To *clear* up the ſeveral parts of this theory, I was willing to lay aſide a great many other ſpeculations. *Burnet's Theory.*—

Many knotty points there are,
Which all diſcuſs, but few can *clear*. *Prior.*

3. To purge from the imputation of guilt; to juſtify; to vindicate; to defend: often with *from* before the thing.—Somerſet was much *cleared* by the death of thoſe who were executed, to make him appear faulty. *Sir John Hayward.*—I will appeal to the reader, and am ſure he will *clear* me *from* partiality. *Dryden's Fables.*—

How! would thou *clear* rebellion? *Addiſon.*

4. To cleanſe: with *of*, or *from*.—

My hands are of your colour but I ſhame
To wear a heart ſo white:
A little water *clears* us *of* this deed. *Shakeſp.*

5. To remove any incumberance, or embarraſſment.—A man digging in the ground did meet with a door, having a wall on each hand of it; from which having *cleared* the earth, he forced open the door. *Wilkins.*—A ſtatue lies hid in a block of marble; and the art of the ſtatuary only *clears* away the ſuperfluous matter, and removes the rubbiſh. *Addiſ. Spect.* 6. To free from any thing offenſive or noxious.—

To *clear* the palace from the foe, ſucceed
The weary living, and revenge the dead. *Dryd.*

—It ſhould be the ſkill and art of the teacher to *clear* their heads of all other thoughts, whilſt they are learning of any thing. *Locke on Education.* 7. To clarify; as, to *clear* liquours. 8. To gain without deduction.—He *clears* but two hundred thouſand crowns a year, after having defrayed all the charges of working the ſalt. *Addiſon.* 9. To confer judgment or knowledge.—Our common prints would *clear* up their underſtandings, and animate their minds with virtue. *Addiſon's Spect.* 10. *To* **Clear** *a ſhip*, at the cuſtom houſe, is to obtain the liberty of ſailing or of ſelling a cargo, by ſatisfying the cuſtoms.

(2.) * *To* **Clear.** *v. n.* 1. To grow bright; to recover tranſparency.—

So foul a ſky *clears* not without a ſtorm. *Shak.*
2. Sometimes with *up*.—

Take heart, nor of the laws of fate complain;
Tho' now 'tis cloudy, 'twill *clear up* again.
Norris.

—Adviſe him to ſtay till the weather *clears up*, for you are afraid there will be rain. *Swift.* 3. To be diſengaged from incumbrances, diſtreſs, or entanglements.—He that *clears* at once, will relapſe; for, finding himſelf out of ſtraits, he will revert to his cuſtoms: but he that *cleareth* by degrees, induceth a habit of frugality, and gaineth as well upon his mind as upon his eſtate. *Bacon.*

* CLEARANCE. *n. ſ.* [from *clear.*] A certificate that a ſhip has been cleared at the cuſtom-houſe.

(1.) CLEARCHUS, a Lacedæmonian who was ſent to quiet the Byzantines, but being recalled, refuſed to obey, and fled to Cyrus the younger, who gave him the command of 13,000 Greek ſoldiers. He obtained a victory over Artaxerxes; who was ſo enraged at the defeat, that when Clearchus fell into his hands by the treachery of Tiſſaphernes, he put him immediately to death.

(2.) Clearchus, a tyrant of Heraclea in Pontus, who was killed by Chion and Leonidas, Plato's pupils, during the celebration of the feſtivals of Bacchus. He had enjoyed the ſovereign power during 12 years.

* CLEARER. *n. ſ.* [from *clear.*] Brightner; purifier; enlightener.—Gold is a wonderful *clearer* of the underſtanding: it diſſipates every doubt and ſcruple in an inſtant. *Addiſon.*

* CLEARLY. *adv.* [from *clear.*] 1. Brightly; luminouſly.—Myſteries of grace and ſalvation, which were but darkly diſcloſed unto them, have unto us more *clearly* ſhined. *Hooker.* 2. Plainly; evidently; without obſcurity or ambiguity.—Chriſtianity firſt *clearly* proved this noble and important truth to the world. *Rogers.* 3. With diſcernment; acutely; without embarraſſment, or perplexity of mind.—There is almoſt no man but ſees *clearlier* and ſharper the vices in a ſpeaker than the virtues. *Ben Johnſon.* 4. Without entanglement, or diſtraction of affairs.—He that doth not divide, will never enter into buſineſs; and he that divideth too much, will never come out of it *clearly*. *Bacon's Eſſays.* 5. Without by ends; without ſiniſter views; honeſtly.—When you are examining theſe matters, do not take into conſideration any ſenſual or worldy intereſt; but deal *clearly* and impartially with yourſelves. *Tillotſon.* 6. Without deduction or coſt. 7. Without reſerve; without evaſion; without ſubterfuge.—By a certain day they ſhould *clearly* relinquiſh unto the king all their lands and poſſeſſions. *Davies.*

* CLEARNESS. *n. ſ.* [from *clear.*] 1. Tranſparency; brightneſs.—It may be, percolation doth not only cauſe *clearneſs* and ſplendour, but ſweetneſs of ſavour. *Bacon's Nat. Hiſt.*—Glaſs in the furnace grows to a greater magnitude, and refines to a greater *clearneſs*, only as the breath within is more powerful, and the heat more intenſe. *Bacon.* 2. Splendour; luſtre.—Love, more clear than yourſelf, with the *clearneſs*, lays a night of ſorrow upon me. *Sidney.* 3. Diſtinctneſs; perſpicuity.—If he changes to think right, he does not know how to convey his thoughts to another with *clearneſs* and perſpicuity. *Addiſ. Spect.* 4. Sincerity; honeſty; plain dealing.—When the caſe required diſſimulation, if they uſed it, the former opinion ſpread abroad of their good faith and *clearneſs* of dealing, made them almoſt inviſible. *Bacon.* 5. Freedom from imputation.—I require a *clearneſs*. *Shak.*

* CLEARSIGHTED. *adj.* [*clear* and *ſight.*] Perſpicuous; diſcerning; judicious.—

Clearſighted reaſon, wiſdom's judgment leads;
And ſenſe, her vaſſal, in her footſteps treads.
Denham.

* *To* CLEARSTARCH. *v. a.* [from *clear* and *ſtarch.*] To ſtiffen with ſtarch.—He took his preſent lodging at the manſion houſe of a taylor's widow, who waſhes, and can *clearſtarch* his bands. *Addiſon.*

CLEARSTARCHER, *n. ſ.* a woman who waſhes and dreſſes fine linens.

CLEASBY, a town in Yorkſhire, on the Tees; SW. of Darlington.

CLEATOR, in Cumberland, near Egremont.

CLEATOP, in Yorkſhire, 1 mile from Settle.

CLEATS, in naval affairs, pieces of wood having one or two projecting ends whereby to faſten the ropes: ſome of them are faſtened to the ſhrouds below for this purpoſe, and others nailed to different places of the ſhip's deck or ſides.

(1.) * *To* CLEAVE. *v. a. preterite, I clove, I clave, I cleft;* part. paſſ. *cloven,* or *cleft.* [*cleofan,* Sax. *kloven,* Dutch.] 1. To divide with violence; to ſplit; to part forcibly into pieces.—

And at their paſſing *cleave* th' Aſſyrian flood.
Milton.

—The fountains of it are ſaid to have been *cloven*, or burſt open. *Burnet.*—

The bleſſed miniſter his wings diſplay'd,
And, like a ſhooting ſtar, he *cleft* the night.
Dryden.

Not half ſo ſwift the trembling doves can fly,
When the fierce eagle *cleaves* the liquid ſky.
Pope.

2. To divide; to part naturally.—And every beaſt that parteth the *hoof*, and *cleaveth* the cleft into two claws. *Deut.*

(2.) * *To* Cleave. *v. n.* 1. To part aſunder.—

Wars 'twixt you twain, would be
As if the world ſhould *cleave*, and that ſlain men
Should ſolder up the rift. *Shak.*

—The ground *clave* aſunder that was under them. *Numbers.* 2. To ſuffer diviſion.—It *cleaves* with a gloſſy polite ſubſtance, not plane, but with ſome little unevenneſs. *Newton.*

(3.) * *To* Cleave. *v. n.* pret. *I clave.* [*cleofan,* Sax. *kleven,* Dutch.] 1. To adhere; to ſtick; to hold to.—The clarifying of liquours by adheſion is effected when ſome *cleaving* body is mixed with the liquours, whereby the groſſer part ſticks to that *cleaving* body. *Bacon.*—When the duſt groweth into hardneſs, and the clods *cleave* faſt together. *Job.*—

The thin camelion, fed with air, receives
The colour of the thing to which ſhe *cleaves.*
Dryden.

2. To unite aptly; to fit.—

New honours come upon him,
Like our ſtrange garments, *cleave* not to their mould,
But with the aid of uſe. *Shak.*

3. To unite in concord and intereſt; to adhere.—The apoſtles did conform the Chriſtians, according to the pattern of the Jews, and made them *cleave* the better. *Hooker.*—The men of Judah *cleave* unto their king. *Samuel.*—The people would revolt, if they ſaw any of the French nation to *cleave* unto. *Knolles.* 4. To be concomitant to; to be united with.—We cannot imagine, that, in breeding or begetting faith, his grace doth *cleave* to the one, and forſake the other. *Hooker.*

* *A* CLEAVER. *n. ſ.* [from *cleave.*] 1. A butcher's inſtrument to cut animals into joints.—You, gentlemen, keep a parcel of roaring bullies about me day and night, with huzzas and hunting horns, and ringing the changes on butchers *cleavers. Arbuthnot.*—

Tho' arm'd with all thy *cleavers*, knives,
And axes made to hew down lives. *Hudibras.*

2. A weed. Improperly written CLIVER.

CLEBORNE-HALL, a village in Weſtmoreland, near Penrith.

CLEBUCZ, a town of European Turkey, in Dalmatia, 11 miles SSE. of Moſtar.

CLEBURG. See KLEBURG.

(1.) CLEBURY, or CLEOBURY MORTIMER, a town in Shropſhire, ſeated on the Rea, or the Temde; 8 miles W. of Bewdley, 28 SE. of Shrewſbury, and 136 NW. of London. It has a market on Mond. and fairs May 2, and Oct. 27. Lon. 2. 23. W. Lat. 52. 21. N.

(2.) CLEBURY PARK, on the Rea, in Shropſh.

CLECHE, in heraldry, a kind of croſs, charged with another croſs of the ſame figure, but of the colour of the field.

END OF THE FIFTH VOLUME.

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